National Park Service
U.S. Department of the Interior

Aztec Ruins National Monument

Environmental Assessment

For XTO Energy to Continue Operating the Fee 9Y and Fee 4-A Natural Gas Wells

Aztec Ruins National Monument

Aztec, New Mexico
November, 2004

In 1916, Congress created the National Park Service in the Department of the Interior to:

…promote and regulate the use of the Federal areas know as national parks, monuments, and reservations…by such means and measures as to conform to the fundamental purpose of said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. (NPS Organic Act, 16 U.S.C. § 1)

Prepared by
United States Department of the Interior • National Park Service
Aztec Ruins National Monument

Environmental Assessment

Proposal by XTO Energy to Continue Operating the Fee 9Y and Fee 4-A Natural Gas Wells within Aztec Ruins National Monument Aztec, New Mexico

Summary

XTO Energy submitted a Plan of Operations to the National Park Service (NPS) to continue operating two existing natural gas wells, the Fee 9Y and Fee 4-A, within Aztec Ruins National Monument (Park).

This Environmental Assessment (EA) evaluates two alternatives for XTO Energy's existing operations. Alternative A is the "no action" alternative which sets a baseline of existing conditions continued into the future against which to compare impacts of "action" alternatives. In this case, No Action means that the NPS would allow XTO Energy to continue operating the wells in a "grandfathered" status (i.e., without an approved plan of operations and performance bond). Alternative B is the proposed action as defined in the proposed Plan of Operations submitted by XTO Energy and also includes any additional requirements identified from agency and public comments. No impairment would result from implementation of either of the alternatives. Alternative B is the Environmentally Preferred Alternative and the NPS Preferred Alternative.

Impact topics analyzed under both alternatives include: archeological resources, cultural landscapes, and visitor use and experience.

Under Alternative A, there would be localized, minor to moderate, short to long term, adverse impacts on archeological resources; minor to moderate, localized, short term to long term, adverse impacts on cultural landscapes; and localized, negligible to moderate, short term and long term, adverse impacts on visitor use and experience. Under Alternative B, there would be similar impacts, but generally of less intensity than the No Action alternative. Specifically, there would be: localized, negligible, long term, adverse impacts on archeological resources; localized, minor to moderate, short to long term, adverse impacts on cultural landscapes; and localized, negligible to moderate, short term and long term, adverse impacts on visitor use and experience. Through an approved plan of operations and its performance bond, reduction in impacts under Alternative B would be achieved primarily by greater protection of cultural resources, improved road and well site maintenance, spill control and response measures, and surface reclamation to NPS standards.

Public Comment. Please mail comments on the Plan of Operations and EA to the address below. The documents will be on public review for 30 days from the publication date of a notice of availability in the *Federal Register*. Names and addresses of people who comment become part of the public record. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment letter. We will make all submissions from organizations, businesses, and individuals identifying themselves as representatives or officials of organizations or businesses available for public review in their entirety.

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Table of Contents

List of Tables

List of Figures

Purpose and Need

This Environmental Assessment (EA) evaluates two alternatives for the National Park Service (NPS) to permit XTO Energy (XTO) to continue operating the Fee 9Y and Fee 4-A Natural Gas Wells within Aztec Ruins National Monument (the Park). The purpose of this analysis is to provide a decision-making framework for the NPS to evaluate XTO's use of parklands to continue developing its mineral rights while protecting and preventing an impairment to park resources, allowing for a safe visitor experience; and to determine whether an Environmental Impact Statement (EIS) should be prepared.

Need for Taking Action

The Park acquired surface ownership of the Fee 4-A well in 2000. A private entity retained the subsurface mineral interests. This well falls under the requirements of the NPS's Nonfederal Oil and Gas Rights Regulations at 36 CFR 9B.

A private entity retains surface ownership and subsurface mineral interests of the Fee 9Y well. However, because access to the Fee 9Y well requires crossing over federally-owned lands within the Park, this well also falls under the requirements of the NPS's Nonfederal Oil and Gas Rights Regulations at 36 CFR 9B.

On January 1, 2003, XTO acquired the Fee 9Y and Fee 4-A natural gas wells from Energen Resources. Energen Resources operated the two wells under the grandfathered provision of the NPS's Nonfederal Oil and Gas Rights Regulations, under 36 CFR § 9.33. The change of ownership triggered the need for XTO to comply with the NPS 9B regulations in their entirety and prepare a Plan of Operations.

XTO Energy submitted a plan of operations on October 1, 2004, to the NPS describing how it proposes to continue operating the 2 natural gas wells. The plan of operations has been reviewed by the NPS and determined to be substantially complete. The Superintendent of the Park formally accepted the plan for agency evaluation and public review. The NPS must decide whether to approve the plan and if additional mitigation measures are needed.

Background Information

The Fee 9Y was drilled in 1981, and the Fee 4-A was drilled in 1983. The life of the wells could continue 10 to 25 years, or longer. Table 1 provides general information about the wells.

Table 1 Well Descriptions

Well	Date Completed	Total Depth	Producing Zone	Location
Fee 9Y	February 24, 1981	TD 4794' Plugged Back Depth is 4753'	Pictured Cliffs and Mesa Verde from perforated interval 2082' to 4600'	Legal Description: 152' FNL & 910' FWL, Section 9 T-30_N, R-11-W, San Juan County, New Mexico.
Fee 4-A	August 23, 1983	TD 4930' Plugged Back Depth is 4840'	Pictured Cliffs and Blanco Mesa Verde from perforated interval 3069' to 4780'	Legal Description: 1850' FSL & 955' FWL, Section 4, T-30-N, R-11-W, San Juan County, New Mexico.

Current operations occupy approximately 2.74 acres. A breakdown of the total area of surface disturbance by operation is provided in Table 2.

Table 2 Current Area of Surface Disturbance

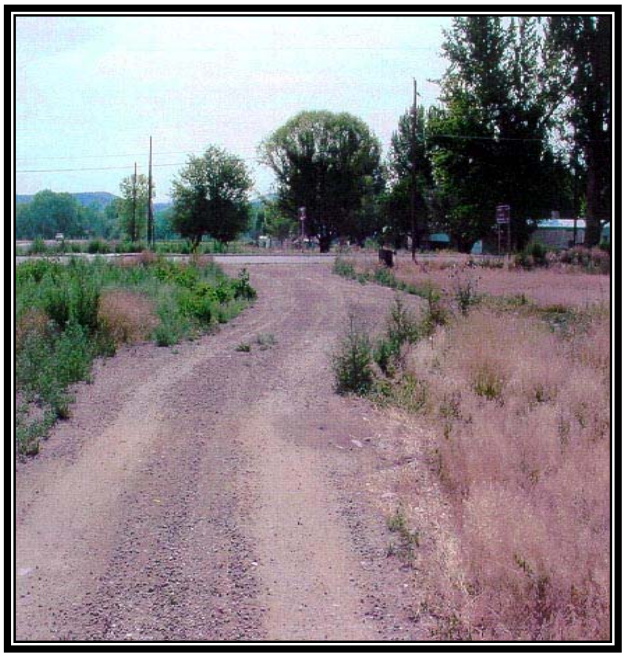
Type of Operations	Area of Surface Disturbance
Fee 9Y Wellpad	0.45 acres including disturbance inside and outside the fenced area
Fee 9Y Access Road	0.10 acres for 285' long x 16' wide access road
Fee 4-A Wellpad	1.69 acres
Fee 4-A Access Road	0.50 acres for 1200' long x 18' wide access road
Total Area of Surface Disturbance	2.74 acres or approximately 120,000 square feet

Access Roads

Access to the Fee 9Y well is via paved Ruins Road heading north to a west turn onto about a 285-foot stretch of dirt road that crosses over park land. The dirt portion of the access road is shown in Figure 4. Access to the Fee 4-A is north via paved Light Plant Road to a east turn on to dirt roads for about a ½ mile. The dirt road enters the Park at a locked gate (Figure 1), and travels about 1200 feet to the wellpad.

Both access roads are graded dirt that can become very muddy and subject to rutting from traffic when wet. The Fee 4-A access road crosses two slight drainages, where culverts have been installed. There are also a couple of water bars installed along the side to help with water runoff. During wet weather, grading of the road has been necessary. The Fee 4-A access road is shared by another well operator, Manana, who uses it to access the nearby Bobbie Herrera well.

Figure 1 Access Road to Fee 9Y



On left, shared segment of 9Y access road from Ruin Road. Below, 9Y access road forks to location behind trees.

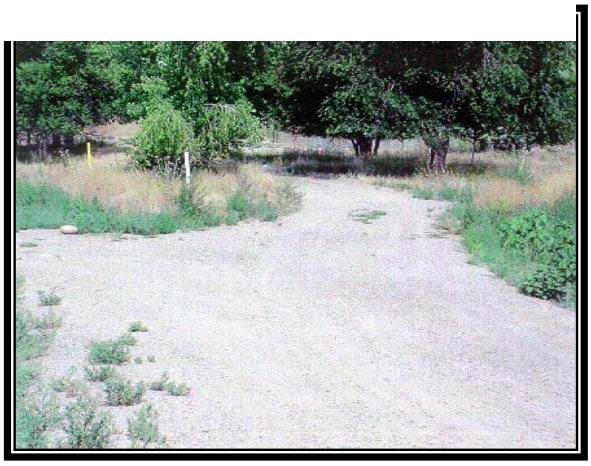
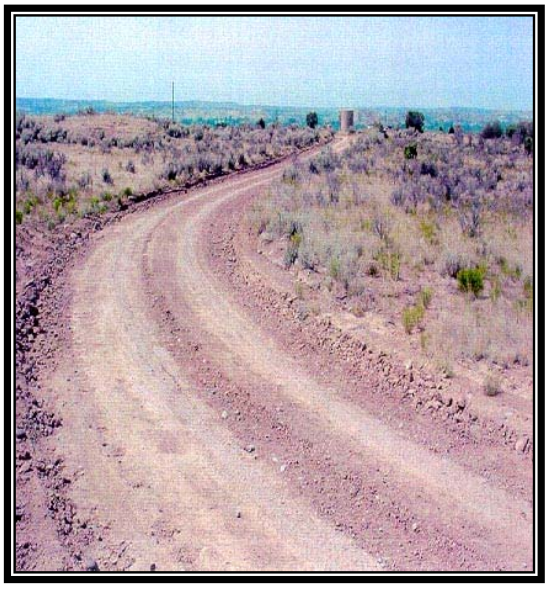
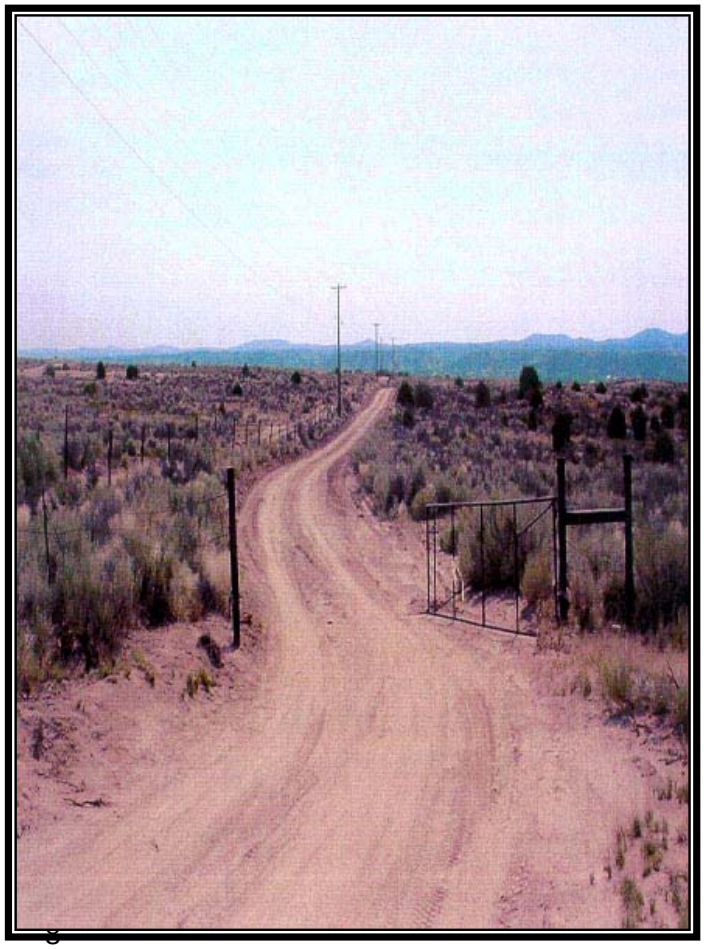


Figure 2 Fee 4A Access Road





Above, the 4A access road as it approached the well location. To the right, the 4A access road as it enters the gate on the Aztec Ruins NM park boundary**.**

Figures 3 through 6 are photographs and schematic drawings for the Fee 9Y and 4A operations.

Figure 3 Photographs of Fee 9Y Operations

Figure 4 Plat of Fee 9Y Location and Equipment

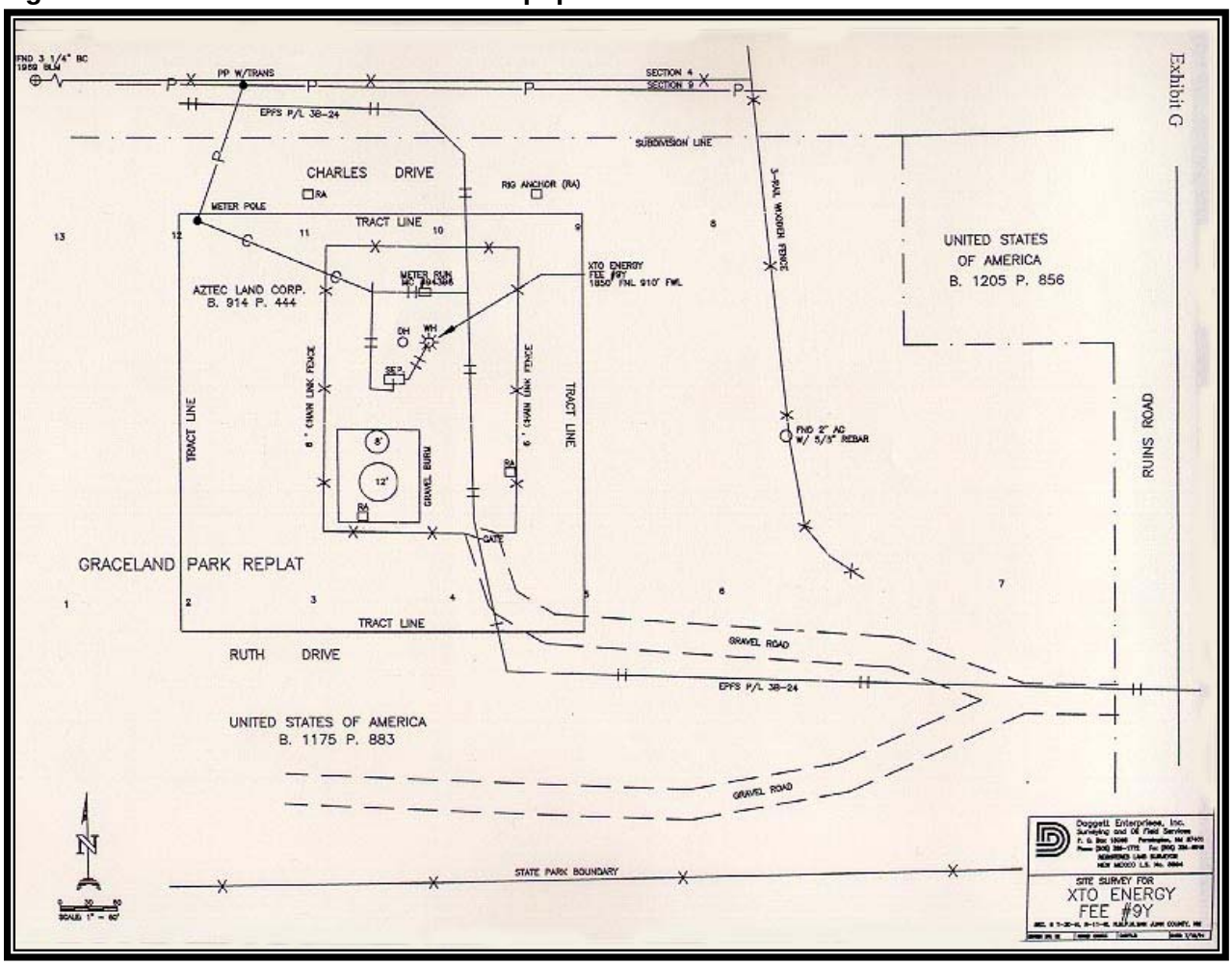
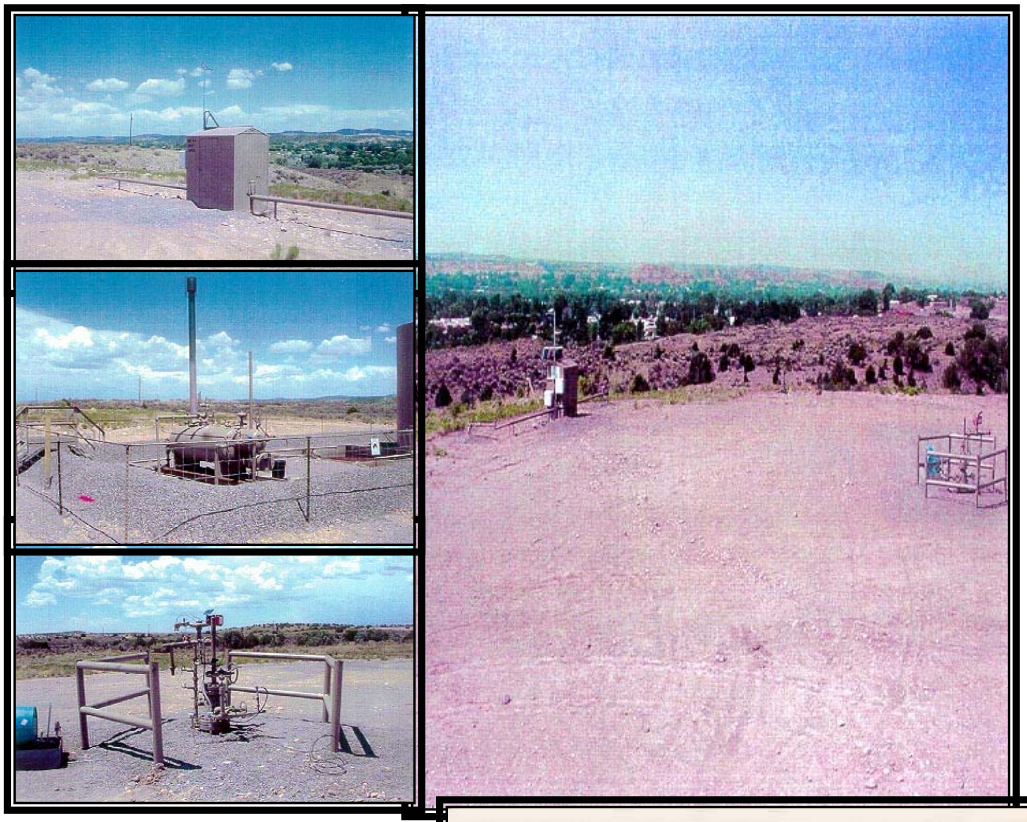


Figure 5 Photographs of Fee 4-A Operations



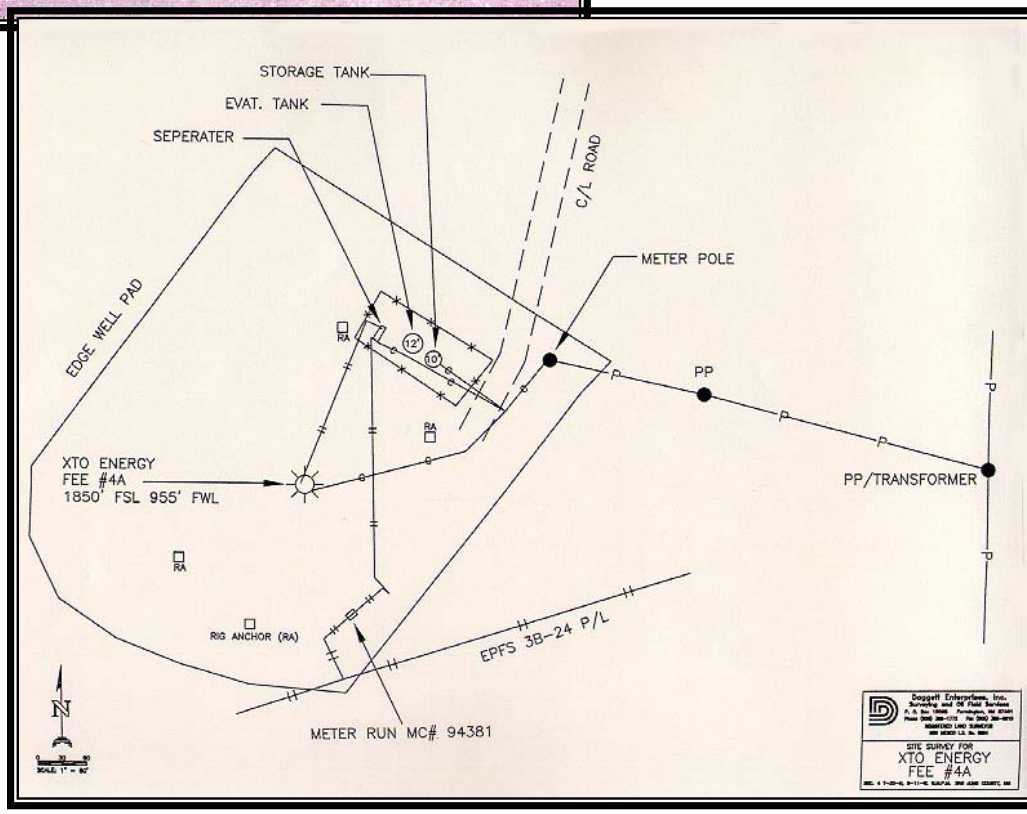


Figure 6 Plat of Fee 4-A Location and Equipment

Figure 7 Regional Map Depicting the Location of Aztec Ruins National Monument

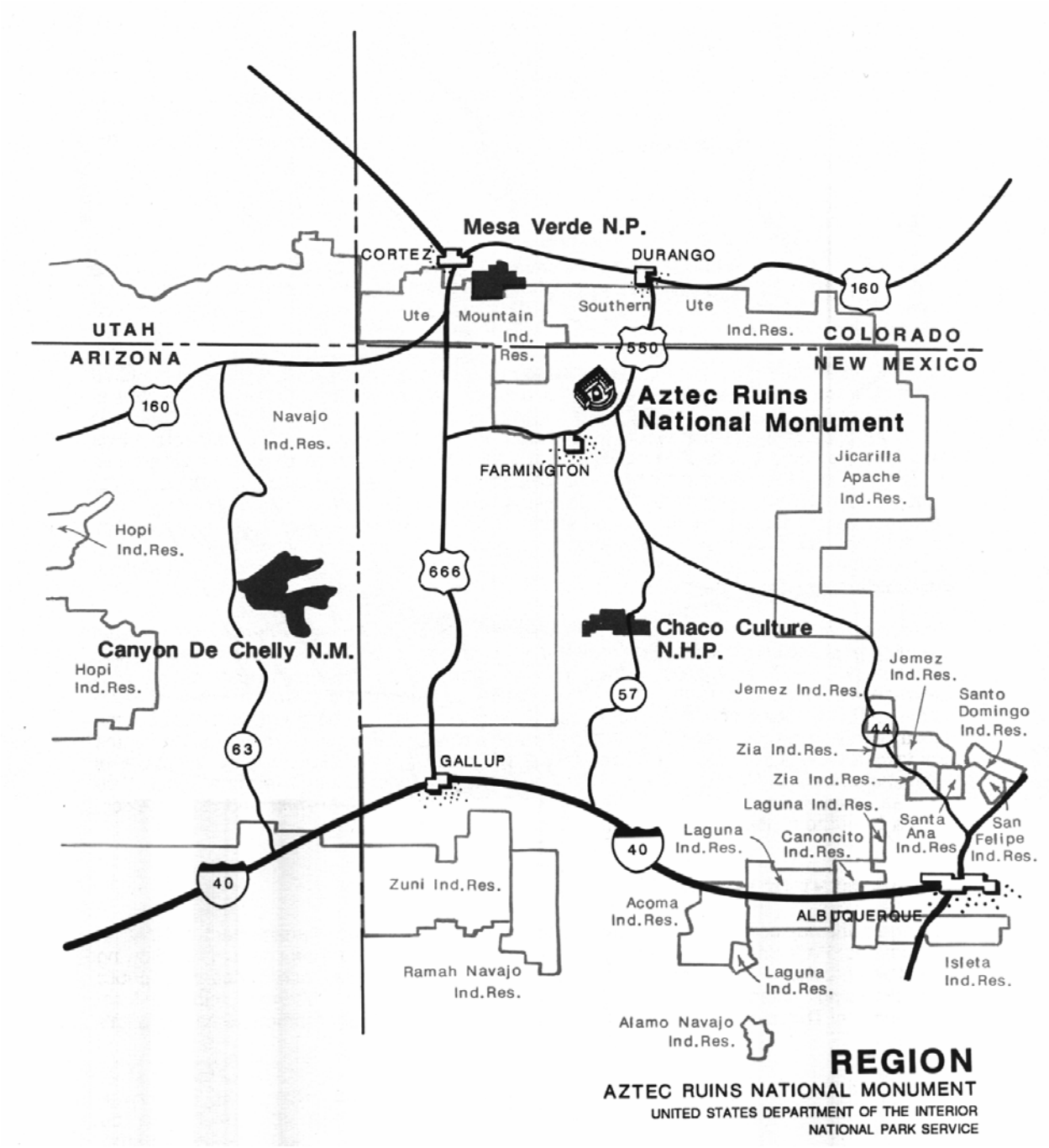


Figure 8 Area Map Showing Location of the Park in Relation to Nearby City of Aztec

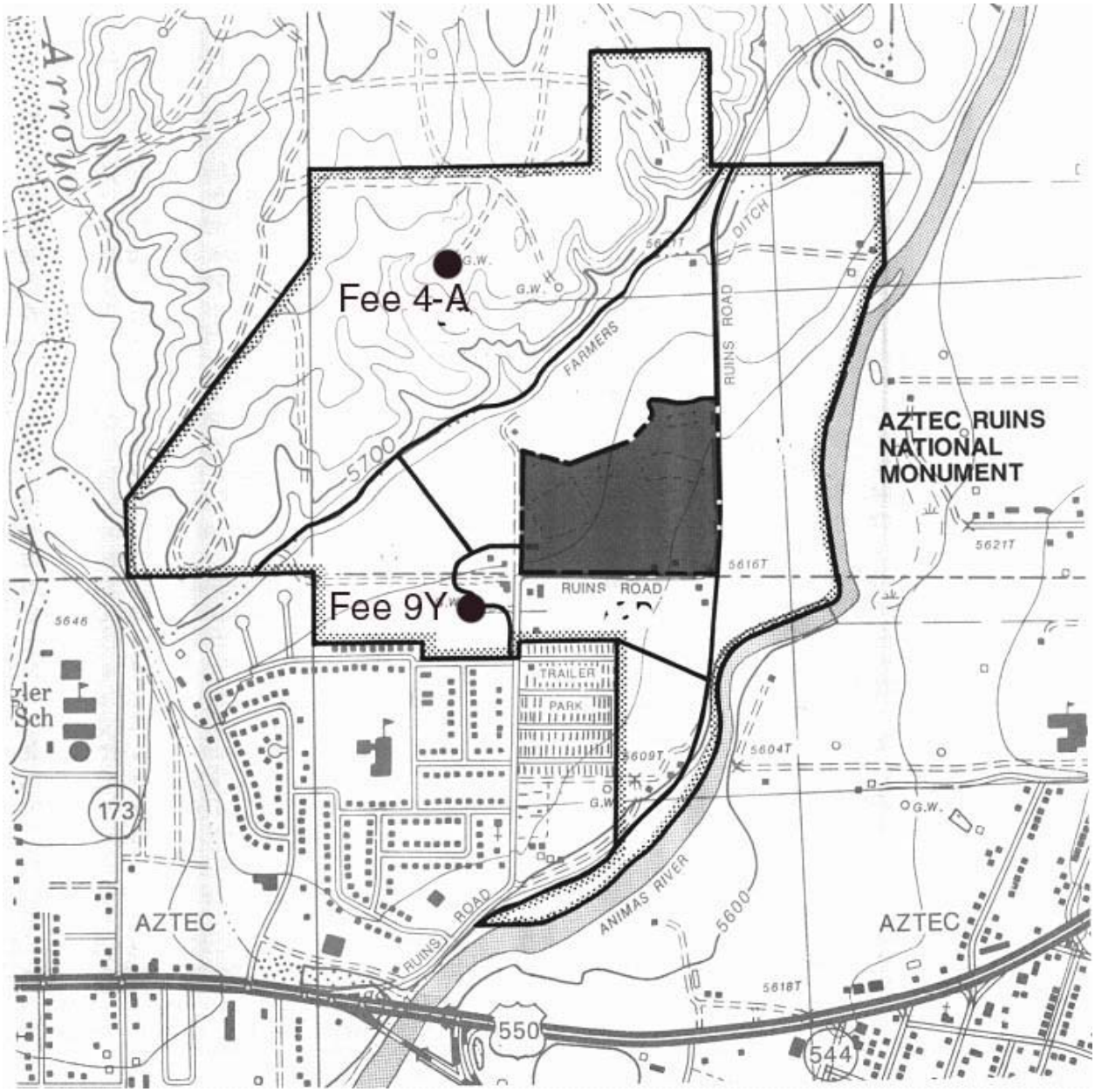
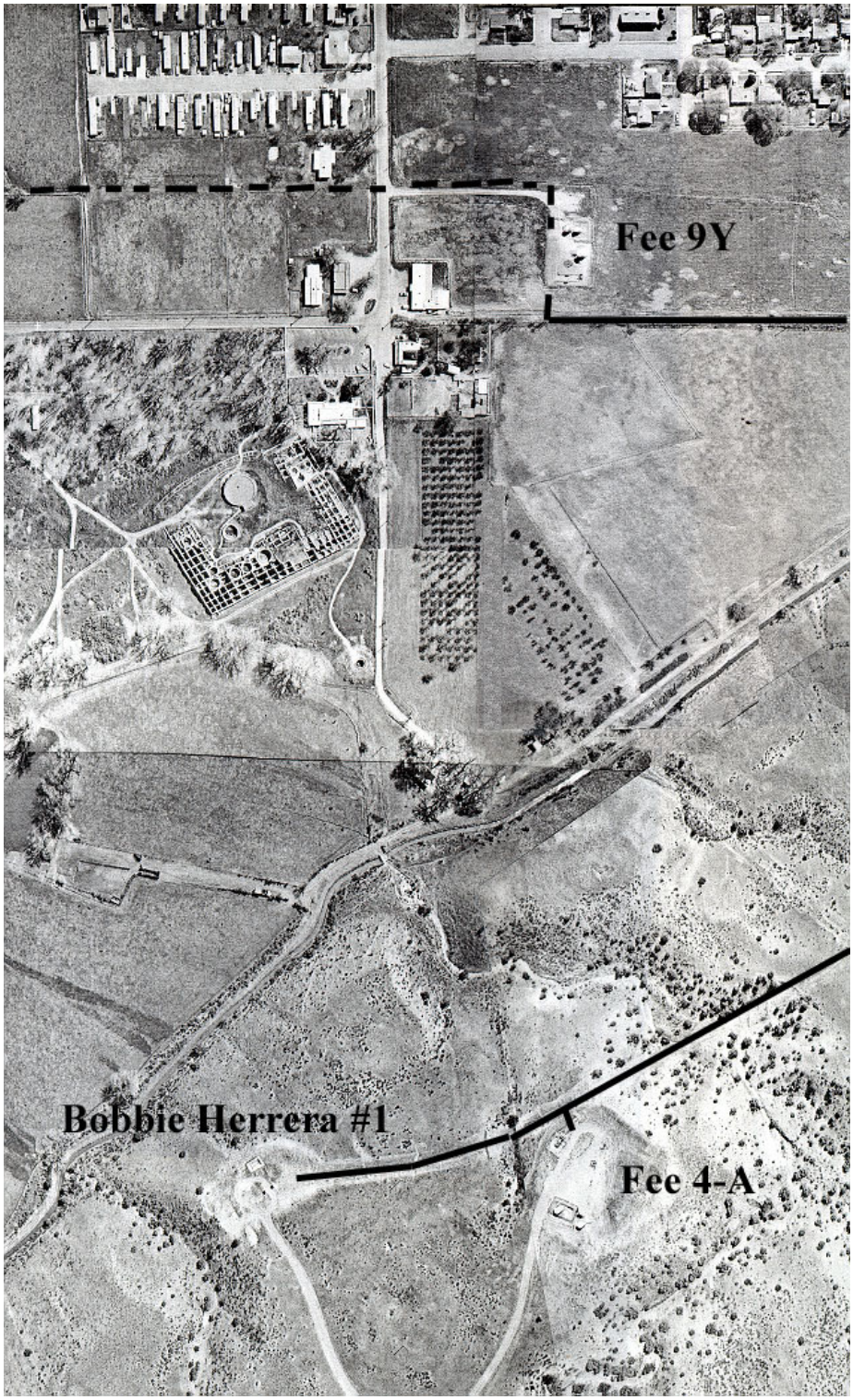


Figure 9 Aerial Photos Showing Locations of the Two Gas Wells. West Ruin is left of Center. The Bobbie Herrera #1 is a third gas well not under consideration in this EA.



The analysis area for evaluating direct and indirect impacts in this EA includes:

- The direct area of impact would include access roads through the park to access the operations, the 2 natural gas well sites, including the wellheads, associated operational equipment such as the separators, blowdown tanks, storage tanks, meter houses, and piping.
- The indirect area of impact for each park resource or value could vary for each impact topic; but generally would not extend more than 1,500 feet beyond the wells. NPS has selected the 1500-foot offset because this is the distance required for elevated noise to attenuate to background levels.
- The analysis area for evaluating cumulative impacts on park resources and values is parkwide and areas contiguous to the park.

Objectives of Taking Action

There are three objectives for this project:

- Provide XTO Energy, as the lessee of nonfederal oil and gas mineral interests, reasonable access for exploration and development.
- Avoid, minimize, or mitigate impacts on park resources and values, visitor use and experience, and human health and safety.
- Prevent impairment to park resources and values.

Special Mandates and Direction

The NPS evaluates project-specific proposals for oil and gas exploration, production and transportation on a case-by-case basis by applying a variety of Current Legal and Policy Requirements prior to issuing a permit under the general regulatory framework of the NPS Nonfederal Oil and Gas Rights Regulations (36 CFR 9B). The following discussion is a summary of the management direction the NPS follows for permitting nonfederal oil and gas operations in units of the National Park System.

NPS Organic Act and General Authorities Act – Prevention of Impairment

The NPS Organic Act of 1916 (16 U.S.C. § 1 *et seq*) provides the fundamental management direction for all units of the National Park System. Section one of the Organic Act states, in part, that the NPS shall:

"…promote and regulate the use of the Federal areas known as national parks, monuments, and reservations…by such means and measure as conform to the fundamental purpose of said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." 16 U.S.C. § 1.

The National Park System General Authorities Act of 1970 (16 U.S.C. § 1a-1 *et seq.)* affirms that while all national park system units remain "distinct in character," they are "united through their interrelated purposes and resources into one national park system as cumulative expressions of a single national heritage." The Act makes it clear that the NPS Organic Act and other protective mandates apply equally to all units of the system. Subsequently, the 1978

Redwood Act Amendments to the General Authorities Act further clarified Congress' mandate to the NPS to protect park resources and values. The Amendments state, in part: "[t]he authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress." 16 U.S.C. §1a-1.

Current laws and policies require the analysis of potential effects to determine whether actions would impair park resources. While Congress has given the NPS the managerial discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement (enforceable by the federal courts) that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise (2001 Management Policies, §1.4).

These authorities all prohibit an impairment of park resources and values. Not all impacts are impairments. An impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts. The NPS Management Policies explain that an impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is:

1). Necessary to fulfill a specific purpose identified in the establishing legislation or proclamation of the park;
2). Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
3). Identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute impairment to the extent that it is an unavoidable result, which cannot be reasonably further mitigated, of an action necessary to preserve or restore the integrity of park resources or values.

NPS Management Policies explain that "resources and values" mean the full spectrum of tangible and intangible attributes for which the parks are established and are being managed, including the Organic Act's fundamental purposes (as supplemented), and any additional purposes as stated in a park's establishing legislation. Park resources and values that are subject to the no impairment standard include: the biological and physical processes which created the park and that continue to act upon it; scenic features; natural visibility; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures and objects; museum collections; and native plants and animals. Additional resources and values that are subject to the non-impairment standard include the park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system.

For these reasons, the Environmental Consequences section of this EA provides an analysis of the potential for impairment for each of the resource topics covered in this EA.

Park Legislative History

Aztec Ruins National Monument was established on 4.62 acres in 1923 by Presidential Proclamation (January 24, 1923, 42 Stat. 2295, appended). In recognition of a "…ruin of great antiquity and historical interest," President Warren G. Harding established the national monument "…with a view to the preservation of said ruin for the enlightenment and culture of the Nation." Executive Orders 1840 (July 1, 1928, 45 Stat. 2954) and 1928 (December 19, 1930, 46 Stat. 3040) added 14.4 more acres, including the East Ruin, the museum's field headquarters, and Earl Morris's home in the southwest corner of the monument. Executive Order 1928 also included an additional 6.87 acres purchased from the heirs of H.D. Abrams, the original owner of the entire site. A 1948 donation of the 1.25 acre Hubbard site from the Southwestern Monuments Association (Presidential Proclamation No. 2787, May 27, 1948, 62 Stat. 1513) brought the monument to 27.14 acres. Public Law 100-559 (October 28, 1988, title IV,) authorized an expanded monument boundary of nearly 320 acres.

As of December, 2004, there are 257.33 acres within park boundaries that are owned and administered by the NPS. Figure 7 is a region map depicting the location of Aztec Ruins National Monument. Figure 8 is an area map showing the location of the park and the two gas wells in relation to nearby City of Aztec. Figure 9 shows the location of the two gas wells in relation to the West Ruin in the Park.

Park Mission

Aztec Ruins National Monument is the site of a remarkable community of ruins along the Animas River in northwest New Mexico. These ancient structures of the early Pueblo people are preserved and protected to tell their stories, so that the people of today and future generations can understand and appreciate that multi-faceted culture. We work toward that goal in cooperation with park neighbors, partners, tribes, and others, moving forward together to shape our future.

Park Statements of Significance

The community that took shape at the Aztec Ruins site from the late 1000s to 1280 A.D. contains a unique complex of architectural features that include rare tri-walled structures, multi-story great houses, road alignments, earthworks, and ceremonial buildings that together contribute to a highly modified, ritual landscape exhibiting symmetry and careful planning.

Because of the nature and extent of the resources, Aztec Ruins National Monument provides outstanding opportunities for continued archeological research and discovery. Aztec Ruins contains some of the most remarkably well-preserved and visible indigenous architecture in the Southwest. The designed landscape and many of the individual structures are monumental in scale. Masonry, wood elements, earthwork features, and artifacts are unusually well-preserved. Aztec Ruins is the best tree-ring-dated site in the Southwest.

Aztec Ruins is a prominent expression of a much longer human history in the larger Four Corners region. The site played a significant role in the widespread Chacoan system, and offers insights into that system's nature, extent, and chronology. Its physical integrity and ability to contribute to understanding that system were recognized in 1987 when Aztec Ruins National Monument was included in the designation of Chaco Culture National Historical Park as a World Heritage Site.

Aztec Ruins is sacred for many American Indians who maintain strong spiritual connections to the site.

The pioneering excavations of the American Museum of Natural History provided archeological data and explanations that influenced interpretations of cultural history in the San Juan Basin for half a century, and the profession as a whole. The reconstruction of the Great Kiva was an unparalleled effort in the history of southwestern archeology, and offers visitors an exceptional opportunity to connect with the people who built this ceremonial structure.

NPS Nonfederal Oil and Gas Regulations, 36 CFR 9B

The authority to manage and protect federal property arises from the Property Clause of the United States Constitution. The Property Clause provides that "Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States . . ." U.S. Const. Art. IV, § 3, cl. 2.

In 1916, Congress exercised its power under the Property Clause and passed the NPS Organic Act, 16 U.S.C. § 1 *et seq*. Section 3 of the Organic Act authorizes the Secretary of the Interior to "make and publish such rules and regulations as he may deem necessary or proper for the use of the parks…" 16 U.S.C. § 3.

Pursuant to section 3 of the NPS Organic Act and individual park statutes, the Secretary of the Interior promulgated regulations at 36 CFR Part 9, Subpart B ("9B regulations") in 1979. The 9B regulations apply to operations that require access on or through federally owned or controlled lands or waters in connection with nonfederally owned oil and gas in all National Park System units (36 CFR § 9.30(a)).

The NPS Nonfederal Oil and Gas Rights Regulations (36 CFR 9B) and other regulatory requirements assist park managers in managing oil and gas activities so they may be conducted in a manner consistent with the NPS mandate to protect park resources and values. The application and implementation of these regulations on the ground must be assessed parkwide for each site-specific oil and gas activity to determine if these activities have the potential to impair park resources and values.

Owners of nonfederal oil and gas rights within units of the National Park System may exercise those rights subject to National Park Service regulations in Title 36 Code of Federal Regulations, Part 9, Subpart B (9B Regulations). The regulations require oil and gas operators in parks to submit a plan of operations for NPS approval. The plan details all activities of the oil and gas development, describes how reclamation will be completed, and provides the basis for determining the amount of the performance bond. The NPS uses the information to determine the effects of proposed operations and alternatives on the human environment, park management, and visitor experiences. Once approved, the plan serves as the operator's permit to conduct operations in the park.

NPS Oversight and Monitoring of Nonfederal Oil and Gas Operations

Under 36 CFR §9.37(f) "[a]pproval of each plan of operations is expressly conditioned upon the Superintendent having such reasonable access to the site as is necessary to properly monitor and insure compliance with the plan of operations." At Aztec Ruins National Monument. park staff routinely visit natural gas sites.

Pursuant to 36 CFR §9.51(a) an "operator shall be held liable for any damages to federally-owned or controlled lands, waters, or resources, resulting from his failure to comply with . . . his plan of operations" (emphasis added). Undertaking any operations within the boundaries of a park system unit in violation of the 9B regulations shall be deemed a trespass against the United States and shall be cause for revocation of approval of an operator's plan of operations. If an operator violates a term or condition of its approved plan of operation the Superintendent has the authority to temporarily suspend the operation and give the operator the chance to cure the violation. 36 CFR §9.51(c) outlines the Superintendent's suspension authority and procedure. If an operator fails to correct any violation or damage to federally owned or controlled lands, waters, or resources the operator's approval will be revoked. 36 CFR §9.51(c)(3).

In addition to the remedies available to the NPS under the 9B regulations, an operator is also subject to the remedial provisions found in all applicable federal, state, and local laws. For instance, under 16 U.S.C. §19jj, commonly known as the "Park System Resource Protection Act," any person who destroys, causes the loss of, or injures any park system resource is strictly liable to the United States for response costs and for damages resulting from such destruction, loss or injury.

Approved Park Planning Documents

Approved park planning documents also provide a framework for determining how nonfederal natural gas operations are conducted within Aztec Ruins National Monument.

The General Management Plan (GMP) is the major planning document for all National Park System units. The GMP sets forth the basic philosophy and management directions for the park unit, and provides strategies for resolving issues and achieving identified management objectives required for resource management and visitor use. The GMP includes environmental analysis and other required compliance documentation. The current GMP for Aztec Ruins National Monument was prepared in 1989. The park is currently in the second year of a process to create a new GMP. Completion of the new GMP is anticipated in 2006.

The current GMP calls for the moving of the gas well storage tanks, separator, and dehydrator of the Fee 9Y pad to another location that poses no hazard to NPS facilities or surrounding residential/commercial development. The new location for these structures would be connected with a buried line. The gas well head would remain in its present location.

However, as the new GMP planning proceeds, this action is being questioned as to whether it is necessary. Discussions regarding this issue will continue during the GMP planning process.

Applicable Legal and Policy Requirements

Table 3, below, summarizes many, but not all, of the Current Legal and Policy Requirements that apply to nonfederal oil and gas operations in the park. The proposed action, Alternative B, described and evaluated in this EA, is subject to these requirements. The no-action alternative, Alternative A, is subject to many of these requirements, but to a limited extent.

Table 3 Current Legal and Policy Requirements Governing Nonfederal Oil and Gas Operations

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
Statutes and Applicable Regulations	
NPS Organic Act of 1916, as amended, 16 U.S.C. § 1 *et seq.*	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources.
National Park System General Authorities Act, 16 U.S.C. § 1A-1 *et seq.*	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources.
National Park Service Omnibus Management Act of 1998, 16 U.S.C. § 5901 *et seq.*	Any living or non-living resource
NPS Nonfederal Oil and Gas Regulations – 36 CFR Part 9, Subpart B	All, e.g., air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, T&E species, visitor use and experience
16 U.S.C. § 19jj (commonly referred to as Park System Resource Protection Act)	Any living or non-living resource that is located within the boundaries of a unit of the National Park System, except for resources owned by a nonfederal entity.
Enabling legislation for Aztec Ruins National Monument, Proclamation 1650 Jan 24, 1923, 42 Stat. 2295	Cultural and educational values
American Indian Religious Freedom Act , as amended, 42 U.S.C. §§ 1996 – 1996a; 43 CFR Part 7	Cultural and historic resources
Antiquities Act of 1906, 16 U.S.C. §§ 431-433; 43 CFR Part 3	Cultural, historic, archeological, paleontological resources
Archeological Resources Protection Act of 1979, 16 U.S.C. §§ 470aa – 470mm; 43 CFR Part 7; 36 CFR Part 296; 32 CFR 229; 18 CFR 1312	Archeological resources
Clean Air Act, as amended, 42 U.S.C. §§ 7401q; 40 CFR Parts 50, 51, 52, 58, 60, 61, 82, 93, and 48; CFR Part 23	Air resources
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601-9675; 40 CFR Parts 279, 300, 302, 355, and 373	Human health and welfare and the environment
Endangered Species Act of 1973, as amended, 16 U.S.C. §§ 1531-1544; 50 CFR Parts 10, 17, 23, 81, 217, 222, 225, 402, and 450; 36 CFR Part 13	Plant and animal species or subspecies and their habitat, which have been listed as threatened or endangered by the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS).

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
Federal Insecticide, Fungicide, and Rodenticide Act, as amended (commonly referred to as Federal Environmental Pesticide Control Act of 1972), 7 U.S.C. § 136 *et. seq.;* 40 CFR Parts 152-180, except Part 157	Human health and safety and the environment
Federal Land Policy and Management Act of 1976, 43 U.S.C. § 1701 *et seq.;* 43 CFR Part 2200 for land exchanges and 43 CFR Parts 1700-9000 for all other parts for other BLM activities	Federal lands and resources administered by the Bureau of Land Management
Federal Water Pollution Control Act of 1972 (commonly referred to as Clean Water Act), 33 U.S.C. § 1251 *et seq.;* 33 CFR 320-330; 40 CFR Parts 110, 112, 116, 117, 230-232, 323, and 328	Water resources, wetlands, and waters of the U.S.
Historic Sites, Buildings, and Antiquities Act (Historic Sites Act of 1935), 16 U.S.C. § 461-467; 18 CFR Part 6; 36 CFR Parts 1, 62, 63 and 65	Historic sites, buildings and objects
Lacey Act, as amended, 16 U.S.C. § 3371 *et seq.;* 15 CFR Parts 10, 11, 12, 14, 300, and 904	Fish and wildlife, vegetation
Migratory Bird Treaty Act, as amended, 16 U.S.C. § 703-712; 50 CFR Parts 10, 12, 20, and 21	Migratory birds
National Environmental Policy Act of 1969, 42 U.S.C. § 4321 *et seq.;* 40 CFR Parts 1500-1508	The human environment (e.g. cultural and historic resources, natural resources, biodiversity, human health and safety, socioeconomic environment, visitor use and experience)
National Historic Preservation Act of 1966, as amended, 16 U.S.C. §§ 470-470x-6; 36 CFR Parts 60, 63, 78, 79, 800, 801, and 810	Cultural and historic properties listed in or determined to be eligible for listing in the National Register of Historic Places
Native American Graves Protection and Repatriation Act, 25 U.S.C. §§ 3001-3013; 43 CFR Part 10	Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony
Noise Control Act of 1972, 42 U.S.C. §§ 4901-4918; 40 CFR Part 211	Human health and welfare
Oil Pollution Act, 33 U.S.C. §§ 2701-2761; 40 CFR Part 112; 33 CFR Parts 135, 137, and 150; 49 CFR Part 106; 15 CFR Part 990	Water resources, natural resources
Pipeline Safety Act of 1992, 49 U.S.C. § 60101 *et seq*.; 49 CFR Parts 190-195	Human health and safety, and the environment
Resource Conservation and Recovery Act, 42 U.S.C. § 6901 *et. seq*.; 40 CFR 240-280; 49 CFR 171-179	Natural resources, human health and safety

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
Rivers and Harbors Act of 1899, as amended, 33 U.S.C. § 401 *et. seq*.; 33 CFR Parts 114, 115, 116, 321, 322, and 333	Shorelines and navigable waterways, tidal waters, wetlands
Safe Drinking Water Act of 1974, 42 U.S.C. § 300f *et seq*.; 40 CFR Parts 141-148	Human health, water resources
Executive Orders	
Executive Order 11,593 – Protection and Enhancement of the Cultural Environment, 36 Fed. Reg. 8921 (1971)	Cultural resources
Executive Order 11,988 – Floodplain Management, 42 Fed. Reg. 26,951 (1977)	Floodplains, human health, safety, and welfare
Executive Order 11,990 – Protection of Wetlands, 42 Fed. Re. 26,961 (1977)	Wetlands
Executive Order 12,088 – Federal Compliance with Pollution Control Standards, 43 Fed. Reg. 47,707 (1978)	Natural resources, human health and safety
Executive Order 12,630 – Governmental Actions and Interference with Constitutionally Protected Property Rights, 53 Fed. Reg. 8859 (1988)	Private property rights, public funds
Executive Order 12,898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, amended by Exec. Order No. 12948, 60 Fed. Reg. 6379 (1995)	Human health and safety
Executive Order 13,007 – Indian Sacred Sites, 61 Fed. Reg. 26,771 (1996)	Native Americans' sacred sites
Executive Order 13,112 – Invasive Species, 64 Fed. Reg. 6183 (1999)	Vegetation and wildlife
Policies, Guidelines and Procedures	
NPS Management Policies (2001)	All resources including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, visual resources
Dept. of the Interior, Departmental Manual, DM 516 –NEPA policies	All resources including cultural resources, historic resources, natural resources, human health and safety
Dept. of the Interior, Departmental Manual, DM 517 - Pesticides	Human health and safety and the environment
Dept. of the Interior, Departmental Manual, DM 519 – Protection of the Cultural Environment	Archeological, prehistoric resources, historic resources, Native American human remains, and cultural objects
Dept. of the Interior, Onshore Oil and Gas Order Number 2, Section III, Drilling Abandonment Requirements, 53 Fed. Reg. 46,810-46,811 (1988)	Human health and safety
NPS Director's Order -12 and Handbook –	All resources including natural resources, cultural

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
National Environmental Policy Act (Draft)	resources, human health and safety, socioeconomic environment, visitor use
NPS Director's Order – 28 – Cultural Resource Management	Cultural, historic, and ethnographic resources
NPS 66 – Minerals Management Guideline	Natural resources, human health and safety
NPS 77 – Natural Resources Management Guideline	Natural resources
NPS Director's Order 77-1 – Wetland Protection	Wetlands
NPS Director's Order 77-2 – Floodplain Management	Floodplains
Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation," 48 Fed. Reg. 44716 (1983), also published as Appendix C of NPS Director's Order 28 – Cultural Resource Management	Cultural and historic resources
Government-to-Government Relations with Native American Tribal Governments, Presidential Memorandum signed April 29, 1994	Native Americans – Tribal sovereignty and interests
Selected New Mexico Laws and Regulations	
New Mexico Administrative Code, Title 19 Natural Resources and Wildlife, Chapter 15 Oil and Gas, Parts 1 through 15	Human health and safety, natural resources
New Mexico Administrative Code, Title 20 Environmental Protection, Chapters 1 through 11	Human health and safety, natural resources

Scoping

Early in the planning and development of the plan of operations by XTO Energy, the NPS met with XTO Energy to identify the resources, values, and other concerns that could be potentially impacted by the continuing operation of the 2 natural gas wells. In addition, the NPS sought input from the public and other federal, state, and local agencies. A news release requesting public input was sent to local newspapers and radio stations, with a public scoping period from March 19, 2004 through April 23, 2004. In addition, the news release was sent to park neighbors and officials of the City of Aztec. A scoping letter dated March 23, 2004 was sent to 48 tribal representatives from 25 American Indian tribes. A scoping letter dated March 23, 2004 was sent to the New Mexico State Historic Preservation Officer. A scoping letter dated March 19, 2004 was sent to the Advisory Council on Historic Preservation. A scoping letter dated March 18, 2004 was sent to the US Fish and Wildlife Service and to the New Mexico Game and Fish.

One scoping comment was received from the general public. A concern was raised about the negative appearance of a pile of dirt at the Fee 9-Y well, but otherwise the comment expressed that the appearance of the well operation was fine. The comment was forwarded to XTO

Energy, who soon after removed the pile of dirt. This comment was not considered an issue for this EA.

A scoping comment from a tribal representative expressed concern over the possibility of fires and explosions from the gas well operations. Related to this comment was another that suggested that the park have a temporary storage facility for the park's museum collection should it be necessary because of the fire possibility. Comments received from two different tribes expressed the desire for the federal government to discontinue the gas well operations within the park and inquired whether the federal government could acquire the mineral rights. Comments from two tribes supported the identification of cultural resources that might be affected by the operations.

The Hopi Tribe requested face-to-face consultation with the park regarding their concerns about sub-surface testing to identify affected cultural resources within the area of potential affect of this project. The park's Chief of Resources Management traveled to Hopi tribal headquarters and met with Hopi personnel from the Cultural Preservation Office on May 19, 2004. Hopi tribal representatives expressed concerns regarding the appropriateness of active natural gas wells within a national monument. They indicated that their concerns for sub-surface testing in connection with the cultural resources survey are connected with cultural affiliation issues. They also suggested that the access road to the Fee 4-A well be padded to protect any cultural resources along the road. The Hopi Tribe also sent a letter to the park dated June 14, 2004. The letter emphasized some of the concerns they expressed in the May 19 meeting with the Chief of Resources Management. They stated that they "oppose continued commercial extractive operations within Aztec." The tribe also recommended the action of "filling over the road to protect any intact deposits."

No other concerns were raised during scoping.

Issues and Impact Topics Evaluated

Based on internal scoping and scoping with the public and other entities, the NPS identified the following park resources, values and other concerns for evaluation in this EA:

- Archeological Resources
- Cultural Landscapes
- Visitor Use and Experience

For the above park resources, issue statements were developed to define problems or benefits pertaining to the proposal to continue operating the 2 natural gas wells. The issue statements in Table 4, below, describe a cause-and-effect relationship between an activity and a resource, value, or concern. The issue statements were used in developing and evaluating alternatives.

Table 4 Issue Statements

Impact Topic	Issue Statements
Archeological Resources	• Maintenance and use of gas well access roads, well pads, production equipment, drips and flowlines; vehicle use on and off access roads could damage or destroy archeological resources that are known to

Impact Topic	Issue Statements
	occur in the immediate area. • The release of hydrocarbons and hazardous or contaminating substances from vehicles, wellheads, drips, compressors, storage tanks, and flowlines could damage subsurface archeological deposits. • Heavy equipment used for reclamation efforts, and reclamation such as contouring and reseeding could damage or destroy archeological deposits. • Unauthorized actions such as off-road vehicular use or artifact collecting by XTO or its contractors could result in the theft of archeological deposits.
Cultural Landscapes	• The location and appearance of wellpads, production equipment, and access roads could affect cultural landscapes that have been identified in the area of the wells because they are incongruous with the cultural landscape or maintenance and continued use could modify the cultural landscape. • Reclamation of well pads and access roads could change identified cultural landscapes in the well areas.
Visitor Use and Experience	• The sights, sounds, and odors associated with the continued operation of oil and gas wells, associated equipment, and access roads could negatively affect visitor use of the park and visitor experience of the cultural sites. • Reclamation of well pads and access roads could improve the visitor use and experience of the park.

Issues and Impact Topics Eliminated from Further Analysis

Impact topics are dismissed from further evaluation in this EA if:

- they do not exist in the analysis area,
- they would not be affected by the proposal, or
- through the application of mitigation measures, there would be minor or less effects from the proposal, and there is little controversy on the subject or reasons to otherwise include the topic. Minor impacts are generally those that would result in a change to the resource or value, but the change would be small and of little consequence and would be expected to be short-term and localized. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

For impact topics being dismissed because, due to the application of mitigation measures, the impacts would be minor or less effects, a limited analysis is provided of the direct and indirect effects, in addition to cumulative effects. The following descriptions of adjacent landowners and uses, and socioeconomics, in addition to the description of park development and operations provided in the Affected Environment and Environmental Consequences chapter of this EA, provide the basis for analyzing cumulative impacts in this EA.

Adjacent Landowners and Uses

Private land development adjacent to the boundaries of Aztec Ruins National Monument has produced a mixed community of mobile homes and permanent residences, and will likely

continue to grow. A 400-600 unit residential development is proposed for the north mesa immediately adjacent to the park boundary, with associated grading, drainage modification, road construction, and subsurface utility lines. Initial construction on the development has begun. Aztec Ruins National Monument's boundaries encompass about 320 acres, 257 of which are owned by the National Park Service. The park falls entirely within the City of Aztec. The closest residences fall within about 200 feet of the Fee 9Y well, and about 2500 feet of the Fee 4-A well. Additional residential development within the City of Aztec north and west of the park is likely, where residences could be located within about 700 feet of the Fee 4-A well. The park is also located in the San Juan Basin, a major area of oil and natural gas production, where development is expected to continue. It is not uncommon for residences within the City of Aztec to be located within several hundred feet of operating natural gas wells. The 2 natural gas wells described and evaluated in this EA are subject to NPS 36 CFR 9B regulations, which are more stringent than state laws and local ordinances in terms of protecting park resources and values. The outcome of applying some of these requirements, such as protecting natural soundscapes, could spill over onto adjoining lands and benefit adjacent landowners and uses. The direct and indirect impacts for the proposal and cumulative effects from continuing operations of these two wells will have a localized, short-term, negligible to minor adverse impact on adjacent landowners. Due to the low intensity of impacts, the topic of adjacent landowners and uses was dismissed from further analysis in this EA.

Socioeconomics

Socioeconomic values include local and regional businesses and residents, and the local and regional economy. The local economy and most businesses of the communities surrounding the monument are based on retail trade, professional services, construction, ranching, and energy development and production. The park experiences annual visitation of about 50,000 visitors that contribute to tourist dollars in the cities of Farmington and Aztec. Tourist sales and services are a strong factor in the local and regional economy.

Oil and gas exploration and production have been a major economic factor in the local economy since the early 1950s. The area's energy industry is the largest employment sector in the local economy. In 2000, over 11,000 people in northwest New Mexico were employed by the industry. San Juan County is the largest natural gas producing county in the state. Future production may include the drilling of 10,000 new wells over the next two decades. (BLM RMP and Final EIS)

Aztec Ruins is located in the huge San Juan gas field of northwestern New Mexico. Numerous gas wells dot the landscape around the ruins. Approximately 80 wells are within 1-1/2 miles of the monument, and 5 wells have been drilled inside the current park boundary. Two of the wells were plugged and abandoned in 1970 and 1977. The three active gas wells were drilled between 1979 and 1983, and produce from Cretaceous intervals in the Fruitland Coal, Pictured Cliffs, and Mesaverde formations.

Remediation of the surface areas of the three active well sites is documented at the New Mexico Oil Conservation Division. The 1998 remediation included cleanup of hazardous materials and debris around the meter houses: replacement of the mercury meters with electronic equipment; removal of petroleum hydrocarbon contaminated soil; installation of berms, blowdown tanks, and liners; and removal of old production pits and decrepit tanks.

The Fruitland Coal and Pictured Cliff zones are fully developed within Aztec Ruins, but additional spacing units are available for two new Mesaverde wells. Also, deeper intervals have been productive in areas around the monument, so the potential for new drilling to test deeper

zones exists. It is likely that deeper intervals could be directionally drilled from surface locations outside of the park.

The direct and indirect effects of the proposal, and the cumulative effects of the proposal, will have a short term, negligible impact on local and regional economies. Due to the low intensity of impacts, socioeconomics was dismissed from further analysis in this EA.

Prime and Unique Farmlands

In August 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as prime or unique. Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to NRCS, none of the soils in the project area are classified as prime and unique farmlands. Therefore, prime and unique farmlands was dismissed from further analysis in this EA.

Environmental Justice

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed action would not have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance (1998). Therefore, environmental justice was dismissed from further analysis in this document.

Natural Soundscapes

The continuing operation of the 2 natural gas wells would result in the intermittent, short-term introduction of elevated noise levels due to the occasional use of heavy equipment to maintain the road and wells. One of the wells intermittently vents to a blowdown tank to unload liquids several times a day, with accompanying short term noise. If compressors are added to the wells, additional long-term adverse impacts to the natural soundscape would be created. These impacts would be mitigated through NPS oversight and authority to review proposed equipment and assure that existing technology is used to minimize the noise generated from such equipment.

The park falls within the City of Aztec, with residential development within 200 feet of the Fee 9Y and within 2500 feet of the Fee 4-A wells. Noise from these developments includes vehicles, domestic animals, lawn maintenance tools, construction and utility maintenance equipment, and human voices, together which already have an impact on the natural soundscapes anywhere within the park. County Road 2900 (Ruins Road) runs through the park, and is used by passenger vehicles and heavy vehicles servicing gas wells operations north of the park. The attendant traffic noise can be heard to varying degrees in the park south of the North Mesa.

The direct and indirect effects of continuing operations of the two wells would be localized, short to long term, negligible to minor, adverse impacts. Cumulative impacts to an environment that is already impacted by sounds would be similar with the intensity greater at the minor level. Due to

the low intensity of impacts, the topic of natural soundscapes was dismissed from further analysis in this EA.

Lightscape Management

Both of the two natural gas wells are within 1/3 mile of residential housing, streets, and associated lighting that already affect the night sky. The impacts of any additional lighting for these two wells would make little difference in the already heavily impacted night sky of the nearby area. Because direct and indirect impacts of this proposal and its cumulative impacts would result in negligible, adverse impacts, lightscape management was dismissed from further analysis in this EA.

Floodplains

Executive Order 11988 (Floodplain Management) directs federal agencies to avoid adverse impacts upon floodplains and their occupants if there is a practicable alternative. Pursuant to NPS Director's Order 77-2, Floodplain Management, the NPS is further directed to take action to reduce the risk of flood loss, to minimize impacts of flooding on human safety, health, and welfare, and to restore and preserve the natural and beneficial values of floodplains. The 2 wells and their associated access roads, flowlines and meterhouse are located outside of any regulatory 100-year and 500-foot floodplains. The continuing operation of the 2 natural gas wells would not be sited within, and would have no indirect effect on regulatory floodplains. Therefore, floodplains was dismissed from further analysis in this EA.

Wetlands

Executive Order 11990 Protection of Wetlands was issued by the President "…to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative…" Director's Order 77-1 is to establish NPS policies, requirement, and standards for implementing E.O. 11990. The existing 2 wells and their associated access roads, flowlines and meterhouses are located outside of wetlands; therefore, there would be no potential for direct nor indirect adverse impacts on wetlands. Therefore, wetlands was dismissed from further analysis in this EA.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

There are no Indian trust resources in Aztec Ruins NM. The lands comprising the monument are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, Indian trust resources was dismissed as an impact topic.

Species of Management Concern

To comply with the Federal Endangered Species Act, the NPS has responsibility to address impacts to Federally-listed, candidate, and proposed species. Further, NPS policy directs that

State-listed species and other species identified by the park as being of management concern are to be managed in parks in a manner similar to that for Federally-listed species. Because Aztec Ruins National Monument does not have any species of management concern identified, this category of species will not be addressed further in this document. Thus, Federal and State listed species are the two categories of species to be addressed in this evaluation.

Both the US Fish and Wildlife Service and the New Mexico Department of Game and Fish provided lists of endangered, threatened, candidate, and species of concern that are found in San Juan County.

A list of state and federally-listed endangered (E), threatened (T), proposed (P), candidate (C), and federal Species of Concern (SP) and state sensitive species (SP) that have either been documented in the park or are likely to occur in the park and that could possibly be affected by this project is provided in Table 5, below. A list of federal endangered, threatened, and candidate species can be found at: **http://ifw2es.fws.gov/endangeredspecies/lists/ListSpecies.cfm**. Additional information for both state and federally listed species can be found at: **http://redtail.unm.edu/bisonm/bisonquery.php.** Following the table is a brief description of the four animal species that have been documented in the park.

Table 5 State and Federally Listed Threatened, Endangered, Proposed, Candidate, or Species of Concern or Sensitive Species Known to Occur or Likely to Occur within Aztec Ruins National Monument and that are Potentially Affected by the Project

SPECIES	Federally Listed				State Listed			
	T	E	C	SP	T	E	C	SP
BIRDS								
Bald Eagle *Haliaeetus leucocephalus*	T				T			
Yellow-billed Cuckoo *Coccyzus americanus occidentalis*			C					SP
Southwestern Willow Flycatcher *Empidonax traillii extimus*		E				E		
MAMMALS								
Spotted Bat *Euderma maculatum*					T			
Western Small-footed Myotis Bat *Myotis ciliolabrum melanorhinus*								SP
Yuma Myotis Bat *Myotis yumanensis yumanensis*								SP
Big Free-tailed Bat *Nyctinomops macrotis*								SP
Gunnison's Prairie Dog *Cynomys gunnisoni*								SP

Key: T = Threatened
E = Endangered
C = Candidate
P = Proposed
SP = Species of Concern or Sensitive Species

Bird, mammal, reptile, amphibian, and plant surveys conducted in the park in 2000 and 2001 indicated that the above species were either detected in or appropriate habitat was identified for these species within the park.

Bald eagles have been sighted migrating through the park and occasionally roosting in tall cottonwoods near the Animas River within the park. The yellow-billed cuckoo was detected in the Animas River riparian area during a bird survey. Habitat for the southwestern willow flycatcher was identified adjacent to the Animas River, but detection was not recorded during a bird survey.

This project will not impact these bird species or their habitat, given that the two well sites and associated access roads are situated well beyond the riparian area where these species are likely to occur.

The spotted bat was audibly detected within the park during a bat survey in 2002. The western small-footed myotis bat was captured within the park during the bat survey. The Yuma myotis bat and the big free-tailed bat were detected by echolocation but not by capture.

According to USGS Albuquerque Wildlife Biologist Ernie Valdez, in a telephone conversation on May 14, 2004 with Theresa Nichols, none of the sensitive bat species would be affected by the continued operation of the two wells. Their operation would not affect their roosting habitat, such as vegetation, or water surface availability for foraging. In addition, he stated that the spotted and big free-tailed bats are most likely long distance travelers into the park from their roosting areas elsewhere.

A Gunnison's prairie dog colony is located within the park. Its location is not within the areas of the access roads and wellpads for the two gas wells, and is not affected by continuing operations of the two wells.

During the above mentioned plant and animal surveys and routine monitoring and inspection of the 2 natural gas well locations, specialists and park staff have not documented sighting any state or federally-listed threatened and endangered species in the vicinities of the two wells; therefore, no potential adverse impacts on threatened and endangered species from the continuing operation of the 2 natural gas wells are anticipated. NPS determines the continuing operation of the 2 natural gas wells would have no effect on Federally-listed threatened and endangered species or their habitat in the Park. This determination is based upon two factors: 1) First, the habitat which would be impacted by the continuing operation of the wells is not suitable for the Federally-listed species identified by U.S. Fish and Wildlife Service; and 2) Second, the absence of observations of either of these species near the 2 wellsites. Therefore, due to the Park's finding of no effect on both State and Federally-listed species of management concern, this topic was dismissed from further analysis in this EA.

Wildlife

Despite the park's small size, a variety of habitats support a remarkable diversity of plant and animal species. A two year survey of wildlife conducted over 2001 and 2002 provided data regarding the variety and distribution of animals within the park.

Mammals: Biologists found that the pinon-juniper woodland on the mesa top provided the highest species richness for terrestrial mammals.

The most common mammals captured were the western harvest mouse and the non-native house mouse. Acoustic surveys and capture through mistnetting identified at least seven species of bats. Species richness for bats was highest at the irrigation ditch and Great Kiva, where five species were documented. Several bat species are New Mexico species of concern: Spotted Bat *Euderma maculatum;* Western Small-footed Myotis Bat *Myotis ciliolabrum melanorhinus;* Yuma Myotis Bat *Myotis yumanensis yumanensis;* and Big Free-tailed Bat *Nyctinomops macrotis.* The spotted bat is also a federally listed species of concern. A nesting colony of the pallid bat is present in the supporting roof beams of the reconstructed Great Kiva.

During the inventory season in 2001, biologists captured, observed, or documented previous sightings of the following 19 species of mammals:

Western small-footed myotis, Yuma myotis, big brown bat, spotted bat, pallid bat, Brazilian free-tailed bat, big free-tailed bat, desert cottontail, black-tailed jack rabbit, silky pocket mouse, western harvest mouse, brush mouse, deer mouse, pinon mouse, northern grasshopper mouse, house mouse, white footed mouse, western spotted skunk, and mule deer. Additional species identified by park staff or biologists include: rock squirrel, Gunnison's prairie dog,

Botta's pocket gopher, muskrat, porcupine, coyote, red fox, bobcat, American black bear (an accidental sighting.)

Birds: The riparian and pinon-juniper woodland areas, along with patches of once-cultivated grassy fields, orchards, and desert scrub all provide diverse habitats for birdlife in the park.

As part of the National Park Service's Natural Resources Initiative, ornithologists conducted bird inventories in the park in 2001 and 2002. In addition, a multi-park grant from the National Park Foundation and Hawks Aloft provided for a survey in 2002 of neotropical migrant breeding birds. Prior to these recent inventories, volunteers from the local Audobon Society had compiled a bird checklist for the park that listed 74 species.

During the 2001 field season, a total of 53 species were detected. Of these species, 40 were in riparian habitats, and 14 of those were detected only in riparian zones. Thirty-seven species were detected in upland habitat (the location of the Fee 4-A well), 12 of which were only found in uplands. Although no federally listed species of concern were detected, one State of New Mexico species of concern was detected, the yellow-billed cuckoo.

During the 2002 breeding season, a total of 58 species were detected, including six species previously undetected in the park. The yellow-billed cuckoo was not detected during this season. The two years of inventory yielded a detection of 63 species within the park.

Reptiles and Amphibians**:** Reptile and amphibian inventories were conducted in 2001 and 2002. Reptile and amphibian species documented at Aztec Ruins were: Woodhouse's toad, striped chorus frog, common collared lizard, sagebrush lizard, eastern fence lizard, western whiptail, plateau striped whiptail, striped whipsnake, gopher snake, western terrestrial garter snake, western rattlesnake.

Aztec Ruins was expected to have a fairly diverse community of reptile and amphibian species for a park of its size, largely due to the diversity of habitats found here. Severe drought conditions likely affected the survey results. Many common amphibian species may not have been found due to dry conditions. Expanded park boundaries to the north of the Farmers' Ditch may contain a number of snake species (e.g. Night Snake, Hognose Snake, Common Kingsnake, Glossy Snake) that have not yet been found. Some species, such as the Side-Blotched Lizard and the Tree Lizard that were originally thought to be present were not spotted. Their possible presence has been downgraded, since it is highly unlikely these conspicuous, diurnal species would have been missed by the surveyors.

Wildlife species have been long habituated to the available habitat within the park, and the presence and use of the two wells and access roads. Many of the species mentioned above do not use the habitat in which the two wells are located. The direct and indirect impacts of the continuing operations of the two wells, and the cumulative impacts of those operations, are expected to be short term, negligible to minor, adverse on the wildlife within the park. Therefore, this topic was dismissed from further analysis in this EA.

Soils and Geology

A portion of the Park lies on the alluvial fill of the Animas River. The alluvium consists of clay, silt, sand, and gravel and is derived from the San Juan Mountains in southern Colorado. It is approximately 77 feet thick, and capped by a yellowish-brown loamy soil. It is about 60 inches or less and consists of weakly stratified clay loams, silty clay loams, and loams. The Fee 9Y well is located on the alluvial fill. Pleistocene outwash terraces also occur in the Animas River Valley.

The terraces were derived from late Pleistocene glacial moraines in the San Juan Mountains. They are composed of coarse rounded gravels and sands, and are found along the sides of the valley and mark former Pleistocene river levels and channels. The Animas River has since eroded through these gravel deposits, so that only remnants remain. One of these terraces, commonly referred to as the "north mesa," is in the northern part of the Park upon which the Fee 4-A well is located. The alluvium in the park is underlain by the Nacimiento Formation, composed of shales which grade into sandstone near the top of the unit (Christiansen).

The soils have already been impacted by grazing, agricultural activities, residential development, road building, irrigation, and visitor activities within most of the park. The areas affected by the two gas wells and their access roads (about 2.74 acres) comprise a small percentage of the total area within the park. The well operator, under any of the alternatives analyzed, will maintain the access roads to reduce additional erosion and sedimentation. Reclamation under any of the alternatives will also stabilize the soils in the impacted area and remove contaminated soils. In the event of a leak or spill, hydrocarbons, produced waters, or treatment chemicals could be released. The NPS would have the regulatory authority to suspend operations should there be an immediate threat of significant injury to the park's geology and soils; therefore, major adverse impacts would be prevented. Cleanup of released hydrocarbons, produced waters, or treatment chemicals would be accomplished by XTO Energy which would reduce impacts to the park's geology and soils to negligible to minor. Overall, the direct and indirect impacts of the continuing operations of the two wells, and the cumulative impacts, are expected to be long term, localized, negligible to minor, and adverse on soils and geology within the park. Therefore, this topic was dismissed from further analysis in this EA.

Vegetation

Located along the Animas River, the boundaries of Aztec Ruins encompass 11 vegetation types including riparian, piñon-juniper woodlands, native grasslands, old fields, and restoration areas. Nearly 300 plant species have been documented at the monument. Aztec Ruins and vicinity lie within the Upper Sonoran Life Zone. Vegetation in the monument includes big sagebrush (*Artemisia tridentata* Nutt.), rabbitbrush *(*Chrysothamnus nauseosus (Pall.) Britt.*),* yucca (*Yucca spp.*), Utah juniper (*Juniper osteosperma* (Torr.) Little , pinyon (*Pinus edulis* Engelm.), and a variety of grasses such as blue grama (*Bouteloua gracilis* (H.B.K.) lag.ex Steud.), galleta grass *(Hilaria jamesii* (Torr.) Benth*.,* alkali sacaton (*Sporobolus airoides* (Torr.) Torr.), and Indian ricegrass (*Oryzopsis hyminoides* (R. & S.) Ricker) (Stein and McKenna, 1988; Cully, personal communication, 2004).

Along the Animas River, at the lowest elevation in the park of 5630 feet, riparian vegetation of cottonwoods (*Populus fremontii* Wats.), willows (*Salix exigua* Nutt.; *S. goodiingii* Ball), box elder (*Acer negundo* L. var. *interius* (Britt.) Sarg., and exotic Russian olive (*Eleagnus angustifolia* L.) and tamarisk (*Tamarix* sp.) trees are home to a variety of birds and other animals. As the topography rises away from the river, lands historically irrigated for pasture and fruit trees surround the core area that preserves most of the large prehistoric structures. Since acquiring these previously cultivated lands in the late 1990's, the park has discontinued irrigation according to a long range plan of converting them to Upper Sonoran desertscrub native vegetation. Within the core historic area, native vegetation already dominates the scene.

On the north terrace, the location of the Fee 4-A well, there is a dominance of native grass species, especially of Galleta (*Hilaria jamesii* (Torr.) Benth.) and alkali sacaton. Broom snakeweed (*Gutierrezia sarothae* (Pursh) Britt. & Rusby) also dominates the mesa slopes and tops providing evidence of historic degradation as a result of grazing and fire suppression. Less frequent species include Indian rice grass, prairie three-awn (*Aristida sp*.), big sagebrush, four-

winged saltbrush (*Atriplex caescens* (Pursh) Nutt.), wavy-leaf thistle, and prickly pear cactus (*Opuntia fragilis* Nutt., *O. polyacantha* Haw.). Individuals of several non-native species also occur, including russian thistle (*Salsola iberica* Sennen & Pau), ox-eye daisy (*Chrysantheum leucanthemum*), and cheatgrass (*Bromus tectorum* L.).

The area where the Fee 9Y well is located is in an abandoned field pasture, and is almost completely dominated by non-native grass and tree species. Most dominant is tall fescue (*Festuca arundinacea* Schreb.). Less dominant exotic grass species include Grass #7, timothy (*Phleum pratense* L.), foxtail barley (*Hordeum jubatum* L.), and smooth brome (*Bromus inermis* L.). A minimal amount of the native western wheatgrass (*Agropyron smithii* Rydb.) is present. Chinese elms (*Ulmus pumila* L.) and Russian olives grow along an old roadbed and route of the gas flowline near the well.

The well operations impact a total area of about 2.74 acres. The wells are located in areas where vegetation has already been impacted from minor to moderate levels, primarily by encroachment of non-native species due to a variety of previous land uses. When the operations areas are reclaimed, revegetation would require the re-establishment of native grasses for the representative native landcover type on the north terrace. The direct and indirect impacts of the continuing operations of the two wells, and their cumulative impacts, are expected to be short and long term, localized, negligible to minor, adverse on vegetation within the park. Therefore, this topic was dismissed from further analysis in this EA.

Air Quality

The boundaries of the entire park encompass 320 acres. The park is entirely within the City of Aztec. Many other gas wells are within ½ mile of the park's boundaries. Aztec Ruins National Monument is designated as a Class II air shed under the Prevention of Significant Deterioration (PSD) provisions of the Clean Air Act. Because the park is so small and entirely surrounded by a City, effects on air quality within the park from these two gas wells evaluated in this EA are very difficult to determine. However, their direct and indirect effects, and cumulative effects, are expected to be negligible to minor and adverse on the air quality within the park. Because of the low intensity of the effects, this topic was dismissed from further analysis in this EA.

Ethnographic Resources

Ethnographic resources include traditional cultural properties and items defined by the Native American Graves Protection and Repatriation Act (human remains, funerary objects, sacred items, items of cultural patrimony.) Since the Park has not conducted formal research to identify possible traditional cultural properties within the park, the Park consulted with associated tribes through correspondence regarding their concerns of this project on traditional cultural properties and other ethnographic resources within the project area. None of the tribes consulted specifically identified the potential for traditional cultural properties in the area. Through previous consultation with tribes, the Park has determined that in general, all of the tribes associated with the area consider Aztec Ruins to be a sacred ancestral place.

Regarding other ethnographic resources, one tribe identified their concern for encountering NAGPRA items during subsurface testing associated with the cultural resources survey for the continuing well operations plan. There were no concerns expressed by the tribes for impact specifically to NAGPRA items from the continuing operation of the two wells. Under either alternative, XTO Energy's operations must not pose "an immediate threat of significant injury to park resources". In addition, XTO Energy has indicated a willingness to maintain the road to result in greatly reducing the probability of cultural and NAGPRA items from being encountered

or unearthed. Considering XTO's mitigation measure just stated and that no traditional cultural properties were identified in the project area, the direct and indirect impacts of the project, and cumulative impacts, are expected to be negligible to minor on any ethnographic resources that may be present within the project area. Therefore, this topic was dismissed from further analysis in this EA.

ALTERNATIVES

Two alternatives are described and evaluated in this EA. Alternatives that were considered but dismissed from further analysis are then described. Analyses for selecting the environmentally preferred and NPS preferred alternatives are also provided. This section concludes with three summary tables comparing the two alternatives.

Alternative A, No Action

Alternative A is the "no action" alternative which sets a baseline of existing conditions continued into the future against which to compare impacts of "action" alternatives. In this case, No Action means that the NPS would allow XTO Energy to continue operating the wells in a "grandfathered" status (i.e., without an approved plan of operations and performance bond). The No Action Alternative would violate NPS regulations and policy, but is required under the National Environmental Policy Act (NEPA) to establish a baseline from which to compare the action alternatives.

Under the No Action Alternative, the 2 natural gas wells would continue to be "grandfathered" and would therefore continue to operate without an approved plan of operations. Additionally, pursuant to 36 CFR § 9.33(c), if grandfathered operations pose an immediate threat of significant injury to federally owned or controlled lands or waters, the Superintendent shall require the operator to suspend operations immediately until the threat is removed or remedied. The intent of the 36 CFR § 9.33(c) provision is to ensure that major adverse impacts are avoided, and to prevent an impairment to park resources and values. Any response costs or damages associated with the destruction, loss of, or injury to any living or nonliving resource within the park would be recovered by the NPS by applying 16 U.S.C. § 16jj, the Park System Resource Protection Act.

At the time that XTO Energy acquired the 2 natural gas wells, the operations were "grandfathered" from the plan of operations and most of the regulatory requirements of 36 CFR Part 9B.

Access Roads

Under Alternative A, XTO Energy would maintain the dirt access roads as-needed, which could include grading, installation of additional waterbars, and maintenance of the culverts

Surface Operations, including Wellheads, Compressors, Drips, Flowlines and Meterhouses

Under Alternative A, XTO Energy would continue to use the existing disturbed areas shown in Table 2 to conduct operations. No new surface disturbance would be authorized. Non-routine well work, minor spills, and additions or modifications to facilities such as new artificial lift equipment or gas compressors would occur without notification of park management. XTO Energy's activities would not involve park management, other than routine inspections, so long as operations do not pose "an immediate threat of significant injury to park resources" as described above.

Plugging and Reclamation Plan

The wells would be plugged and the surface area restored in accordance with State of New Mexico Oil Conservation Division Rule 202. Plugging to this standard would protect useable quality water zones. Surface reclamation would consist of 1) marking the exact location of plugged and abandoned wells with a steel marker not less than four inches (4") in diameter set in cement and extending at least four feet (4') above mean ground level, 2) filling all pits, 3)

leveling the location, 4) removing deadmen and all other debris, 5) taking such other measures as are necessary or required by the Oil Conservation Division to restore the location to a safe and clean condition, and 6) passing a final inspection by the Oil Conservation Division.

Mitigation Measures
Under Alternative A, XTO Energy would continue to operate its wells using current practices listed in Table 6 that in effect mitigate affects on resources and human health and safety. However, under this alternative, the NPS could not assure the level to which these mitigation measures would be maintained.

Table 6 Mitigation Measures Under Alternative A, No Action

No.	Mitigation Measure	Resources and Values Affected
1.	Operations area for the Fee 9Y is fenced and gated. Operation area for the Fee 4-A is contained within the greater fenced and gated park area. (36 CFR 9.41(e)).	Protect unit visitors and wildlife, and protect facilities.
2.	Operations areas are signed (36 CFR 9.41(d)).	Protect all resources and values in the park by providing a mechanism for rapid response in the event of a spill or other emergency.
3.	Wells would be plugged in accordance with New Mexico Oil Conservation Division Rule 202.	Groundwater protection.
4.	Production from the Fee 9Y and Fee 4-A natural gas wells would be monitored remotely on a daily basis and would be physically checked daily.	Protect all resources and values in the park by providing a mechanism for rapid response in the event of a spill or other emergency.

Alternative B, Plan of Operations as Submitted Plus Mitigation Measures Identified Through Agency and Public Scoping

Under Alternative B, XTO would conduct its operations in accordance with an NPS-approved plan of operations. The primary approval standard under 36 CFR, §9.37(a)(1) is use of "technologically feasible methods least damaging to the federally-owned or controlled lands, waters and resources of the unit while assuring the protection of public health and safety." Sections 36 CFR, §9.41 through §9.47 include specific operating standards related to protection of park facilities, operations near surface waters, well control, site security, safety, fire hazards, handling of wastes, inspection and reporting, and cultural resources. Section 36 CFR, §9.39 includes specific reclamation standards for operations on both federal and private surface. XTO Energy has addressed the applicable standards in the proposed plan of operations. These are higher approval and operating/reclamation standards than the "immediate threat of significant injury to park resources" standard of Alternative A.

This alternative addresses basic activities associated with operation of the wells, including continuous production, treatment and separation of gas, liquid hydrocarbons, and water; gas sales to gas gathering pipelines at each well's location; liquid hydrocarbon and water storage and periodic removal from lease by tanker trucks; daily pickup truck traffic for well site visits by XTO Energy personnel to collect production data and inspect equipment; minor equipment repair and maintenance; road and well pad maintenance including vegetation control; and

occasional well servicing. The wells could be in operation for another 10 to 15 years. Future activities may include well treatments to improve production, installation of artificial lift equipment, or addition of gas compressors. Eventually, wells would be plugged and surface reclamation performed at the two sites.

Access Roads
Access to the wells would be the same as described under Alternative A, No Action. Use and maintenance of access roads would be improved under Alternative B as described in the plan of operations. XTO would include crowning and ditching as necessary for water drainage. All efforts will be made to keep traffic on the existing road surface and avoid disturbing any additional areas. Roads for both wells would be kept in an orderly fashion and free from debris. As needed, periodic spraying with herbicides approved by the Superintendent and applied in locations and in a manner acceptable to the Superintendent may be employed to reduce vegetation encroachment on the roads and wellpads.

All road and location maintenance activities would be performed with respect to all known cultural resources. Where cultural resources are at risk from further deepening of the road bed, XTO Energy would remove the risk by installing geotextile materials and appropriate gravel padding on top of the road in a location and manner acceptable to the Superintendent. All traffic would be required to stay on the road surface, travel at a speed less than 10 mph, and not stray onto adjacent property occupied by the cultural site. Existing culverts will be maintained and used for water transport during high flow periods to minimize washouts. No road maintenance of waterbars beyond the road prism or installation of new culverts would be allowed.

Any ground disturbing maintenance activities would be monitored by a qualified archaeologist. When access roads are wet enough that rutting would occur from vehicle use in non-emergency situations, XTO Energy would avoid using the roads and instead drivers will park at the road entrances and walk to the well sites. The total disturbed width on all access portions, including the ditching of the access road shall be limited to approximately 14 feet. XTO shall notify the Park of proposed road maintenance prior to undertaking any such maintenance.

XTO Energy would restrict the width of the driving surface to approximately 12 feet by employing physical barriers such as logs, rocks or stakes and flagging along the sides of the roads. All such barriers shall be removed upon reclamation of the road and well site. In disturbed areas where no archaeological sites have been identified, the soil along the edges of the road that has been deposited by previous road blading could be leveled and restored to the driving surface as appropriate. In this manner, overall disturbance associated with access roads would be reduced to a 14-foot width.

Surface Operations, including Wellheads, Compressors, Flowlines and Meter houses
Surface operations would be the similar to those described under Alternative A, No Action. However, through NPS oversight and authority, adherence to the operating standards of NPS regulations would be assured to a much higher degree of certainty under Alternative B. In addition, the following measures would be implemented:

- Installation of new artificial lift equipment, gas compression, or other long-term facilities would occur only after a proposal has been reviewed by the Superintendent and found to be acceptable and within the scope of the approved plan of operations and environmental assessment.
- When considering additions and modification to existing equipment, existing technology to minimize the noise and sights generated at the source would be used.

- All activities shall use secondary containment basins to collect drips, spills, leaks or any other disposal reuse liquids
- Implementation of a strong spill prevention control and countermeasure (SPCC) plan which addresses not only oil, but other contaminating substances, and includes specific spill reporting requirements to the park Superintendent.

Plugging and Reclamation Plan
In addition to the plugging requirements of the New Mexico Oil Conservation Division Rule 202, the wells would be plugged in accordance with NPS standards. New Mexico and the NPS have the same goals in plugging a well. They are:

- to protect the zones of usable water from pollution or waste, and
- to prevent escape of oil, gas, or other fluids to the surface or other zones.

XTO Energy will provide a plugging procedure to the Superintendent of Aztec Ruins National Monument for his/her review prior to the time of abandonment. Plugging operations will commence only after XTO receives notification that the procedure conforms to NPS plugging standards and is in compliance with the approved plan of operations.

The NPS is not responsible for protecting private mineral interests. Where plugs are set solely to protect nonfederal mineral resources such as oil, gas, coal, potash, etc., the NPS will defer to the state requirements.

A visible abandonment marker will not be set as is the usual practice under New Mexico regulation. In place of a visible abandonment marker, the casing(s) will be cut a minimum of 18 inches below final restored ground level. The well bore will be covered with a metal plate at least ¼ inch thick and welded in place with a weep hole in the metal plate. The well's API and State of New Mexico permit numbers will be permanently attached or stamped to the plate. The hole will then be filled to grade.

XTO Energy would also reclaim the operations areas to meet NPS requirements found at 36 CFR § 9.39(a). These requirements are as follows:

Within the time specified by the reclamation provisions of the plan of operations, which shall be as soon as possible after completion of approved operations and shall not be later than six (6) months thereafter unless a longer period of time is authorized in writing by the Regional Director, each operator shall initiate reclamation as follows:

- Removing all above ground structures, equipment and roads used for operations, except that such structures, equipment and roads may remain where they are to be used for continuing operations which are the subject of another approved plan of operations or of a plan which has been submitted for approval, or unless otherwise authorized by the Regional Director consistent with the unit purpose and management objectives;
- Removing all other man-made debris resulting from operations;
- Removing or neutralizing any contaminating substances;
- Plugging and capping all nonproductive wells and filling dump holes, ditches, reserve pits and other excavations;
- Grading to reasonably conform the contour of the area of operations to a contour similar to that which existed prior to the initiation of operations, where such grading will not jeopardize reclamation;

- Replacing the natural topsoil necessary for vegetative restoration;
- Reestablishing native vegetative communities; and
- Reclamation is unacceptable unless it provides for the safe movement of native wildlife, the reestablishment of native vegetative communities, the normal flow or surface and reasonable flow of subsurface waters, and the return of the area to a condition which does not jeopardize visitor safety or public use of the unit.

Under Alternative B, the reclamation goal would be to return the disturbed surface to the natural conditions and processes that existed before the operations began in such a way that cultural resources are protected.

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Mitigation Measures

Under Alternative B, the NPS would issue a permit to XTO Energy by approving the Plan of Operations, as submitted plus any mitigation measures identified through agency and public comments. Operating and reclamation standards required by the NPS's 36 CFR 9B regulations and other specific mitigation measures in XTO Energy's Plan of Operations are listed in Table 7, below. The measures are intended to avoid or minimize impacts and prevent impairment to park resources and values.

Table 7 Mitigation Measures under Alternative B, Plan of Operations as Submitted

No.	Mitigation Measure	Resources and Values Affected	Reference
1.	Operations areas of Fee 9Y is fenced and gated; of Fee 4-A is included within the fenced and gated park boundary.	Protect unit visitors and wildlife, and protect facilities.	36 CFR 9.41(e) & Plan § VI, Exhibit F & I1
2.	Operations areas are signed.	Protect all living and nonliving resources in the park by providing a mechanism for rapid response in the event of a spill or other emergency.	36 CFR 9.41(d) & Plan § VI, Exhibit H1 & H2
3.	XTO shall make every effort to minimize soil contamination through the use of plastic liners below the equipment or containment vessels to catch any drips or spills. All activities shall use secondary containment basins to collect drips, spills, leaks or any other disposal reuse liquids	Soil, surface and ground water, vegetation, wildlife, human health and safety.	Plan §VI, Item 5
4.	As soon as possible and no later than 6 months after determining that production would not be reestablished, XTO Energy would plug the well(s) and proceed with reclamation	Soil, surface and ground water, vegetation, wildlife, visitor use and experience, human health and safety.	36 CFR 9.39(a)
5.	Wells would be plugged in accordance with New Mexico Oil	Groundwater protection, cultural resources and aesthetics (no	Plan § VII

No.	Mitigation Measure	Resources and Values Affected	Reference
	Conservation Division Rule 202 and NPS standards.	visible abandonment marker).	
6.	XTO Energy has included a spill response plan in its plan of operations (36 CFR 9.41(f) and 9.45). XTO Energy would report to the park, within 24 hours of any release to the ground of 5 gallons or more of oil or contaminating substances, as defined by 36 CR 9.31(o). XTO Energy would also report any discharge into a body of water to the EPA.	Soil, surface and ground water, vegetation, wildlife, visitor use and experience, human health and safety.	Plan § VI, Item 5, & attached spill plan
7.	Production from the Fee 9Y and Fee 4-A would be monitored remotely and through on-site visits on a daily basis.	Soil, surface and ground water, vegetation, wildlife, visitor use and experience, human health and safety.	Plan § VI, Item 6, Access Roads
8.	Any soil contaminated by oil, brine, chemicals, or other substances that would prevent the reestablishment of natural vegetation would be removed from the park and replaced with clean soil.	Soil, surface and ground water, vegetation, wildlife, visitor use and experience, human health and safety.	36 CFR 9.39(a)(2)(iii) and (vi)
9.	After reseeding, the area would be monitored to assess revegetation progress. Revegetation would be considered successful when plant coverage with native species is uniform over the site and is at least 20-30 percent of the plant coverage in adjacent undisturbed areas. If successful revegetation does not occur after a period of 1 year, XTO Energy would take corrective actions acceptable to the NPS to ensure the reclamation standards of 36 CFR § 9.39 are achieved.	Soil, surface and ground water, vegetation, wildlife, visitor use and experience, human health and safety.	Plan § VII
10.	The Aztec Ruins National Park personnel shall receive notice of all significant wellsite or lease activity by telephone from authorized XTO employees.	Soil, surface and ground water, vegetation, wildlife, visitor use and experience, human health and safety.	Plan § VI, Item 5
11.	Freshwater needed for operations, including workovers and plugging operations, would be delivered by truck and obtained from sources outside the park.	Municipal water supply.	36 CFR § 9.35

No.	Mitigation Measure	Resources and Values Affected	Reference
12.	XTO Energy would be held fully accountable for their contractor's or subcontractor's compliance with the requirements of the approved plan of operations.	Soil, surface and ground water, vegetation, wildlife, visitor use and experience, human health and safety, buried cultural resources.	36 CFR § 9.41(g)
13.	XTO would take proactive measures to maintain road driving and shoulder widths to 14 feet and reclaim areas currently beyond that width.	Cultural resources, soils, vegetation	Plan § VI, Item 4
14.	Where cultural resources are at risk from further deepening of the road bed, XTO Energy would remove the risk by installing geotextile materials and appropriate gravel padding on top of the road in a location and manner acceptable to the Superintendent.	Cultural resources	Plan § VI, Item 4

Performance Bond Amount
XTO provides estimates for well plugging of $24,000 per well. Estimates for surface reclamation vary from $2500 to $5000 depending on the extent of contouring required in the final reclamation plan. The NPS considers these to be reasonable estimates.

When determining the bond amount, the total bond amount will be the estimated cost of reclamation plus the liability amount imposed by 36 CFR §9.51(a). See also, 36 CFR §9.48(d)(1) and (2). The liability portion is an amount covering the means for a rapid and effective cleanup to minimize damage from an oil spill, the escape of gas, wastes, contaminating substances or fire caused by operations. The liability amount may not exceed $50,000 per well site under 36 CFR §9.48(d)(2). For XTO's proposed plan, the maximum performance bond amount could be $158,000, which includes reclamation of $58,000 plus $50,000 per well.

In this case, because of the strong spill control and response provisions included in the plan of operations and the lower risk of the proposed production activities, the NPS would set the performance bond amount at $68,000, which includes a total liability amount of $10,000. The greatest liability will occur during well workover and stimulation treatments, which would not occur on both wells at the same time. Thus, it is not necessary to apply a higher liability amount based on both wells at once when determining the bond amount. Though the bond amount is based on both reclamation costs and liability, the amounts are not differentiated. An appropriate amount up to the total bond amount could be attached by the NPS to remedy acts of noncompliance with the plan of operations.

Alternatives Considered but Dismissed from Further Analysis

During the scoping process for this project, the following alternative was considered but dismissed from further analysis in this EA.

NPS Acquisition of the Mineral Rights that are Part of XTO Energy's Proposal
In the event that a proposed operation cannot be sufficiently modified to prevent the impairment of park resources and values, the NPS may seek to extinguish the associated mineral right through acquisition, subject to the appropriation of funds from Congress. With respect to the XTO Energy proposed Plan of Operations, mitigation measures were identified and applied, which substantially reduced the potential for adverse impacts to park resources and values. As a result, the acquisition of mineral rights was dismissed from further consideration in this EA.

Rerouting Access Road to Fee 4-A well to Avoid Cultural Resources
To avoid impacting identified cultural resources in the project area further, rerouting the access road to the Fee 4-A well was considered. The route of the present road is essentially defined by the Park boundary and topography. Presently, it takes advantage of the route that is the most level, does not encounter a significant grade change, and is relatively easily maintained in terms of drainage needs. An alternate route that remains within the park boundary would require crossing substantial water drainages. In addition, it would impact additional cultural resources—both archeological and cultural landscapes—given that these types of resources occur in high density in the area. Rerouting the access road to the only feasible route area would require substantial construction and have additional impact to cultural resources. This alternative was dismissed from further consideration in this EA.

Environmentally Preferred Alternative

Section 101 of NEPA states that "…it is the continuing responsibility of the Federal Government to…(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use which would permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources" [42 U.S.C. §4321 *et seq.* §101 (b)].

The environmentally preferred alternative for the continuing operation XTO Energy's natural gas wells is based on these national environmental policy goals. Under Alternative B, Plan of Operations as Submitted Plus Mitigation Measures Identified Through Agency and Public Scoping, the wells continue operating under an approved plan of operations, with additional mitigation measures applied by the NPS to better ensure the protection and prevention of impairment of park resources and values. Because impacts would be reduced, Alternative B would provide the greatest protection of area and park resources and values. Alternative B best meets all six criteria and is therefore the environmentally preferred alternative.

Alternative A, No Action, continuation of operation under "grandfather" status, would meet all six criteria, but to a lesser extent than Alternative B.

NPS Preferred Alternative

The environmentally preferable alternative is Alternative B because it surpasses Alternative A in realizing the full range of national environmental policy goals as stated in §101 of NEPA. While both Alternatives respect the exercise of oil and gas rights, the NPS preferred alternative is Alternative B because it provides XTO Energy reasonable access to continue the exercise of its

oil and gas rights, while also providing the best protection of park resources and values as the Environmentally Preferred Alternative. The NPS believes Alternative B would fulfill its mandates and direction, giving due consideration to environmental, economic, technical, and other factors.

Table 8 outlines the two alternatives and how well each alternative meets the objectives of this project. Tables 9 provides a summary comparison of Alternatives A and B. Table 10 provides a comparative summary of impacts of each Alternative on the impact topics chosen for further analysis.

Table 8 Extent that Each Alternative Meets Objectives

Objectives	Does Alternative A: No Action Meet Objective?	Does Alternative B: Plan of Operations as Submitted Plus Measures Identified Through Agency and Public Comment Meet Objective?
Provide XTO Energy, as a holder of nonfederal oil and gas mineral interests, reasonable access for exploration and development.	**Yes (+)** XTO would continue operating the wells under "grandfather" status.	**Yes (+)** XTO would continue operating the wells under an approved plan of operations, as submitted by XTO**.**
Avoid or minimize impacts on park resources and values, visitor use and experience, and human health and safety.	**Yes (++)** Under 36 CFR 9.33(c), operations would not cause significant injury to federally owned or controlled lands and waters.	**Yes (++)** Mitigation achieved through the approved plan and NPS regulation would ensure use of "technologically feasible methods least damaging to the federally-owned or controlled lands, waters and resources of the unit while assuring the protection of public health and safety
Prevent impairment of park resources and values.	**Yes (+)** Prevention of impairment could be prevented by the 36 CFR 9.33(c) provision.	**Yes (++)** Prevention of impairment would be better ensured as described above.

Table 9 Comparative Summary of Alternatives

Actions	Alternative A: No Action	Alternative B: Plan of Operations as Submitted Plus Measures Identified Through Agency and Public Comment
General Management	Operations would continue without NPS management, other than routine inspections, so long as they did not pose an immediate threat of significant injury to federal owned or controlled lands or waters.	Operations would continue with NPS managing to meet standard of technologically feasible least damaging methods to park resources while assuring protection of public health and safety.
Access Roads	XTO Energy would continue to use and maintain existing access roads; but may not maintain the roads to provide maximum	XTO Energy would continue to use and maintain existing access roads as per standards specified by XTO Energy in its plan of operations. Access roads would

Actions	Alternative A: No Action	Alternative B: Plan of Operations as Submitted Plus Measures Identified Through Agency and Public Comment
	protection for cultural and natural resources.	be maintained adequately to avoid further impacts to cultural resources and reduce impacts to natural resources by reclaiming road prism to a specified width.
Surface Operations	XTO Energy would continue to use the existing disturbed areas to conduct operations. No new surface disturbance would be authorized. Non-routine well work, minor spills, and additions or modifications to facilities such as new artificial lift equipment or gas compressors would occur without notification to park management. These actions would have no involvement by park management, other than routine inspections, so long as operations do not pose "an immediate threat of significant injury to park resources" as described above.	XTO Energy would continue to use and partially reclaim the existing disturbed areas to conduct operations. No new surface disturbance would be authorized. Park management would be advised of non-routine well work and reportable spills. The NPS would review and approve additions or modifications to facilities such as new artificial lift equipment or gas compressors to a technologically feasible least damaging method standard. Through NPS oversight and authority, adherence to the operating standards of NPS regulations would be assured to a much higher degree of certainty.
Plugging and Reclamation	The wells would be plugged and the surface area restored in accordance with State of New Mexico Oil Conservation Division Rule 202. Plugging to this standard would protect usable quality water zones. A 4-foot high steel post would mark the location of the plugged well. Surface reclamation would meet a standard of returning the location to a safe and clean condition.	The wells would be plugged and the surface area restored in accordance with NPS standards as well as the State of New Mexico Oil Conservation Division Rule 202. Plugging to these standards would protect usable quality water zones. Surface reclamation would be to NPS standards. The reclamation goal would be to return the disturbed surface to the natural conditions and processes that existed before the operations began.

Table 10 Comparative Summary of Impacts

Alternative A: No Action	Alternative B: Plan of Operations as Submitted Plus Additional Measures Identified Through Agency and Public Comment
Archeological Resources	
Existing operations would continue under "grandfathered" status, and result in impacts on archeological resources for up to 10 to 15 years, or longer, with localized, long term, minor to moderate, adverse impacts. Cumulative impacts from past, present, and future oil and gas development, along with other types of ground disturbing activities and visitor use development within and adjacent to the park, would result in long term, minor to moderate, adverse impacts on archeological resources in the park. No impairment would result.	Operations would continue under an NPS-approved Plan of Operations with a goal of avoiding any further impacts to archeological resources. Because accidents and acts of noncompliance are possible, rather that concluding that no further impacts would occur, the NPS analysis expects implementation of Alternative B to result in long-term, negligible adverse impacts. Cumulative impacts from past, present, and future oil and gas development, along with other types of ground disturbing activities and visitor use development within and adjacent to the park, would result in long term, minor to moderate, adverse impacts on archeological resources in the park. No impairment would result.
Cultural Landscapes	
Existing operations would continue under "grandfathered" status, resulting in localized, long term, minor to moderate, adverse impacts on cultural landscapes. Cumulative impacts from past, present, and future oil and gas operations in and adjacent to the park; park operations and development; development exterior to the park's boundaries are expected to result in localized, long term, minor to moderate, adverse impacts on cultural landscapes. No impairment to cultural landscapes would result.	Impacts on cultural landscapes would be similar to, but slightly less than, those under Alternative A, but continue to cause localized, short term and long term, minor to moderate, adverse impacts. Cumulative impacts from past, present, and future oil and gas operations in and adjacent to the park; park activities, park development; and activities exterior to the park boundaries, are characterized as localized, long term, minor to moderate, adverse impacts on cultural landscapes. No impairment to cultural landscapes would result.
Visitor Use and Enjoyment	
Existing operations would continue to cause localized, negligible to moderate, short-term to long term, adverse impacts on visitor use and experience. Cumulative impacts from past, present, and future oil and gas operations in and adjacent to the park; park development; and activities exterior to the park boundaries, would result in localized, minor to moderate, short-term to long-term, adverse or beneficial impacts on visitor use and experience. No impairment to visitor use and enjoyment would result.	Under Alternative B, impacts on visitor use would be slightly less than under Alternative A, but continue to cause localized, negligible to moderate, short-term to long term, adverse impacts. Cumulative impacts from past, present, and future oil and gas operations in and adjacent to the park; park development; and activities exterior to the park boundaries, would result in localized, minor to moderate, short-term to long-term, adverse or beneficial impacts on visitor use and experience. No impairment to visitor use and enjoyment

	would result.

AFFECTED ENVIRONMENT and ENVIRONMENTAL CONSEQUENCES

Methodology

This section describes direct, indirect, and cumulative impacts under the two alternatives. Impacts are described in terms of context, duration, and intensity. The context or extent of the impact may be **localized** (affecting the project area or a single company) or **widespread** affecting other areas of the park and/or the project area, or an industry). The duration of impacts could be **short-term**, ranging from days to three years in duration, or **long-term**, extending up to 20 years or longer. Generally, short-term impacts would apply to construction activities and long-term impacts would apply to roads, production operations, and pipelines. The intensity and type of impact is described as negligible, minor, moderate, or major, and as beneficial or adverse. Where the intensity of an impact can be described quantitatively, the numerical data are presented. However, most impact analyses are qualitative.

Definitions of impact Intensity or severity thresholds are given for each impact issue.

Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq*.), require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). The following park development and operations provide the basis for analyzing cumulative impacts in this chapter:

In this cumulative analysis, the geographic area considered includes the entire park and areas immediately adjacent to the park in all directions. On the north mesa, the location of the Fee 4-A well, the area considered outside of the park boundaries includes the mesa top that encompasses about 1000 acres, lies within the viewshed of the Fee 4-A well, and is where archeological resources related to park resources are situated. This entire area, in addition to the land within the park, is considered to be in the prehistoric cultural landscape. It drops off on the north into lower elevations of badlands type terrain, and on the west into drainages, and on the east by lower elevations, Ruins Road, and the Animas River. Since land adjacent to the park on the south and partially on the east is heavily developed with private residences, for this analysis these areas are considered for about 100 yards beyond the park boundaries. The temporal scope of this analysis is roughly 25 years. The present General Management Plan's life roughly expires by 2008, but a new plan that is currently underway will be in effect for about 20 years. Even today we can anticipate some of the desired future conditions to be outlined in that plan. In addition, the productive life of a gas well could be in the 25 years or longer range.

Future development outside park boundaries are described in this document in the Issues and Impact Topics Eliminated from Further Analysis section under Adjacent Landowners and Uses and Socioeconomics.

In-park development could include the rehabilitation of existing buildings to provide office facilities in the visitor center area, and the addition of new facilities to provide for visitor needs. Construction of an interpretive trail to the north mesa, East Ruin, and other areas of the park will increase visitor access and use to those areas. These areas are currently closed to the public

unless accompanied by park staff. Additional research of cultural and natural resources, including surveys, sub-surface testing, and possible collection of artifacts within the park is anticipated for compliance purposes for park development and to inventory resources for management. Preservation work on archeological sites within the park is anticipated. Work would include stabilizing standing masonry, refilling areas previously excavated through vandalism or other means, and adjusting water drainage to promote preservation of sites.

Organization of Impact Analyses

The impact analyses are organized by impact topic. Under each impact topic, the affected environment is described; impacts under each alternative are given, a cumulative impact analysis is provided (analysis area is parkwide and areas contiguous to the park), and a conclusion is stated. The conclusion section summarizes all major findings, including whether or not an impairment of resources or values is likely or would occur. Impairment analyses are only performed for park resources and values. A description of the NPS mandate to prevent impairment to park resources and values is provided in Section 1 of this EA, on pages10-11 (NPS Organic Act and General Authorities Act--Prevention of Impairment).

Impacts on Archeological Resources

To analyze the impacts on archeological resources, the park used research, existing literature, cultural resource surveys, other park plans, professional judgements and monument staff insights, the New Mexico State Historic Preservation Office, public input, and consultation with other permitting agencies.

Affected Environment

Aztec Ruins contains 41 archeological sites that are listed in the National Park Service's FY2000 Archeological Sites Management Information System. The core area focuses on acreage included within park boundaries up until 1988, and consists of archeological sites covering 27.14 acres. Included are three large "great houses" (excavated and stabilized West Ruin, partially excavated East Ruin, and the unexcavated Earl Morris Ruin); the reconstructed Great Kiva; two unexcavated great kivas; three triwall structures (Hubbard Site, Mounds A and F); an unexcavated small pueblo (Mounds C and D); two trash mounds (Mounds E and H); Mound B; and a cluster of seven houseblocks identified as the West Ruin Annex. The sites within the core area are all included in the listing that designates Aztec Ruins as a UNESCO World Heritage Site.

In acreage included within the expanded park boundaries of 1988, additional archeological sites were added to the park. The 24 sites so far identified in the additional acreage comprise two site clusters in the designated Aztec North Mesa Archeological District, Aztec North and Residence West. The sites include the prominent North Ruin and other single-room and multi-story structures with associated archeological middens, kivas, berms, ramps, linear alignments (roads), platforms, and other features.

Cultural resource surveys performed March-May, 2004 in the vicinity of the two wells provided additional information regarding the archeological resources in the affected areas.

On the Fee 9Y well pad, access road, and associated parking area, the archeological inventory and subsurface testing identified no archeological sites. However, four isolated occurrences of artifacts were recorded. No intact cultural material was found in the areas that underwent subsurface testing.

The Fee 4-A is on the north terrace, in the midst of many recorded archeological sites as described above. The well pad is within 100 yards of a large great house structure known as the North Ruin. Associated with the North Ruin (LA 5603) are many features such as cobble alignments, large depressions suggestive of subsurface great kivas, earthen berms, middens, sherd scatters, cobble concentrations, and swales and berms associated with road alignments. The site survey identified an additional site adjacent to LA 5603 consisting of earthen berms that are an extenstion of the Chaco road noted in association with LA 5603. This was recorded as LA 143517.

About 500 feet of the access road to the Fee 4-A well pad passes through the western margin of LA 5603. The east edge of the access road is 18" higher in places, emphasizing the amount of downcutting in the archeological site that use of the road has caused over the last 20 years or so of use. In April, 2004, during road maintenance that the park permitted XTO Energy to conduct with a grader after the road became deeply rutted from wet weather and traffic use, the grader exposed a cultural deposit in the road bed itself. This deposit was revealed even though the maintenance activity was being monitored by the park archeologist. This deposit was revealed subsequent to the initial cultural resource surface survey that had been performed just weeks earlier but had not visibly located cultural deposits in the road bed.

The access road also crosses LA 143517, the Chaco road associated with LA 5603. Previous road construction and maintenance has impacted the northern portion of the site. Repeated blading of the access road has down cut it, obliterating evidence of the site.

Subsurface testing on the access road within LA 5603 and on the northern part of the Fee 4-A well pad identified no intact cultural deposits in those areas tested. Subsurface testing of the cultural deposit exposed by previous road grading mentioned above revealed a deposit of cobbles and sandstone. The deposit may represent an area of stockpiling or post occupational debris from a nearby architectural feature that was impacted by initial access road blading and further dispersed through road grading and maintenance.

Although no identifiable intact cultural material was found within the road bed through inventory and subsurface testing, "the likelihood that in situ subsurface cultural deposits exist below the present road surface in undisturbed contexts is very high given the road's location within the LA 5603 habitation site boundary." (Meininger, Cultural Resource Inventory).

See Cultural Resources Inventory (restricted distribution) for full description of archeological resources in the areas of these two wells.

Impact Thresholds

The thresholds of change for the intensity of an impact for archeological resources are defined as follows:

Negligible: There are no perceptible consequences to an archeological site(s) potential to yield important information.

Minor: **Adverse impact** - disturbance of a site(s) is confined to a small area with little, if any, loss of important information potential.
Beneficial impact – preservation of a site(s) in its natural state.

Moderate: **Adverse impact** - disturbance of the site(s) would not result in a substantial loss of important information
Beneficial impact – stabilization of the site(s).

Major: **Adverse impact** – disturbance of the site(s) is substantial and results in the loss of most or all of the site and its potential to yield important information.
Beneficial impact – active intervention to preserve the site

Impacts of Alternative A, No Action on Archeological Resources

Under Alternative A, No Action, the existing operations would continue to operate under "grandfathered" status. The NPS's regulatory authority for grandfathered operations under 36 CFR § 9.33(c) limits the NPS from imposing mitigation measures to prevent or minimize environmental impacts. However, under this provision, the Superintendent has the authority to suspend operations if grandfathered operations pose an immediate threat of significant injury to federally owned or controlled lands or waters so as to ensure that major adverse impacts are avoided, and to prevent an impairment of park resources and values.

Under no action, the continued operation of the 2 wells would include vehicular access to both wells on established access roads, in both wet and dry weather. During wet weather, vehicles would continue to create deep ruts in the road. Vehicle drivers may find it difficult to control their vehicles on the wet slippery roads, and stray outside the established roadway or enlarge the road footprint. Off road driving may damage and displace cultural deposits, archeological stratigraphy, and cultural features both within and outside the road bed. Archeological information could be made inaccessible or could be destroyed through this displacement and damage.

Under no action, road maintenance as practiced in the past would continue. This could include periodic road grading and the maintenance of waterbars and culverts. These actions would continue without an archeologist monitoring the operation. Under No Action, the NPS would have the regulatory authority to suspend operations should there be an immediate threat of significant injury to park resources; therefore, major adverse impacts would be prevented. Where the access road crosses LA 5603 and LA 143517, grading could possibly expose and disturb buried archeological deposits within or bordering the road bed, destroying information associated with the deposits. Even if an archeologist monitored the road maintenance, disturbance of archeological deposits could still occur as demonstrated in the recent event described above where an archeologist monitored the road grading and cultural deposits were exposed.

In the event of a leak or spill, hydrocarbons, produced waters, or treatment chemicals could be released. Poorly maintained vehicles could drip or leak motor oil, coolant, and other lubricants on the access roads. Under No Action, the NPS would have the regulatory authority to suspend operations should there be an immediate threat of significant injury to park resources; therefore, major adverse impacts would be prevented. Cleanup of released hydrocarbons, produced waters, or treatment chemicals would be done by XTO Energy under Statewide standards. However, contaminants could damage subsurface archeological features and deposits, destroying information associated with those deposits.

Plugging wells, shutting down and abandoning/removing production equipment and flowlines and use of heavy equipment and vehicles during reclamation activities could have the potential to damage and displace archeological deposits, especially at the Fee 4-A, thus destroying information associated with them. Reclamation would meet Statewide standards. If XTO Energy attempts to restore natural contours, known and unknown archeological deposits could be displaced, destroying information. While NPS regulatory authority under 36 CFR § 9.39(c) would ensure that major impacts are avoided, reclamation could result in less than full protection for the archeological resources in the area. If reclamation is not conducted in a sensitive manner, loss of archeological information could occur over the long term.

The continuing operation of the two wells, including routine maintenance of the dirt access road, and the eventual plugging of the wells and reclamation of the areas could result in adversely impacting archeological resources. Due to the NPS's oversight of operations provided under 36 CFR 9.33(c), major impacts should be avoided; therefore, impacts under Alternative A are expected to be localized, short to long term, depending on the activity, and range from minor to moderate, adverse impacts on archeological resources.

Cumulative Impacts

Under Alternative A, No Action, cumulative impacts on archeological resources throughout the park could result from existing and abandoned oil and gas operations on about 4 acres, in addition to possible future wells. These additional wells, with the construction and maintenance of their associated gas access roads, wellpads, compressors, flowlines, gathering lines, and pipelines, could result in directly exposing and/or disturbing archeological resources, or indirectly affecting archeological resources through soil erosion, compaction and rutting. The result could be long-term minor to moderate adverse impacts on up to 14 acres in the Park.

Future operators, however, would be required to conduct cultural resource surveys to determine the presence of archeological resources. Knowledge gained by such surveys could be used to preserve those resources by locating facilities and construction in areas that will not impact identified resources, and by providing management with knowledge of the locations of those resources to use in other development such as for trails, thereby having a long term beneficial impact on archeological resources.

Hydrocarbons, produced waters, or treatment chemicals could be released during drilling, production, or transport, with minor to moderate adverse impacts, but with mitigation, and prompt response in the event of a spill, the intensity of adverse impacts could be reduced to negligible to minor.

Production operations could last for 20 years or longer, and the potential for leaks and spills of hazardous or contaminating substances from production operations (including flowlines and pipelines) is present. The accidental discharge of drilling fluids during workovers, hazardous waste spills including diesel fuel, leaking fluids from compressors and other equipment, and rupture of flowlines, gathering lines, and pipelines could damage archeological deposits.

Risks associated with accidental releases of hazardous and contaminating substances are reduced to negligible by siting operations on already disturbed areas and by avoiding areas with identified archeological resources. Other mitigation techniques include regular maintenance of production equipment, the use of less toxic or hazardous substances, storing the minimum quantity of contaminating and hazardous substances at operations locations, storing barrels or smaller containers of chemicals with secondary containment, using automatic shut-off valves for disposal wells and on flowlines and pipelines in sensitive resource areas, constructing berms and installing liners at production tank facilities and increasing capacity to accommodate high

precipitation events, and including a Spill Notification and Response Plan in the Plan of Operations.

In the event of a release of contaminating or hazardous substance, the NPS would promptly notify the National Response Center. In the event an operator does not respond promptly or effectively to clean up a release, the NPS proceeds through the National Contingency Plan for cleanup, for which the operator is financially responsible. Cleanup attainment levels are to the baseline soil and surface/ground water chemistries, which are determined by the operator prior to beginning operations or afterwards by measuring off-site (i.e. baseline) conditions. After clean up (of before if it is not certain cleanup is necessary), the NPS requires the operator to collect samples for lab analyses according to the NPS Guideline for the Detection and Quantification of Contamination at Oil and Gas Operations (Appendix G from Oil and Gas Management Plan/Environmental Impact Statement, 2002). In the event that contaminating or hazardous substances are not removed or reduced to predisturbance levels, the NPS may utilize the Park System Resource Protection Act to recover costs associated with the residual damages to park resources.

Other activities in the park that could affect archeological resources include research and surveys, preservation activities, and park development and visitor use. Research and archeological surveys may result in the collection of archeological artifacts, or the testing of deposits and features. Testing and collection may remove cultural deposits from their original context, thereby destroying some of the information that may not be captured through recordation and having an adverse effect on archeological resources. In some contexts research could retrieve archeological information that is in danger of being lost through continued environmental or development impacts, thereby contributing to beneficial impacts on the resources through increased visitor understanding leading to improved protection. Preservation activities include placing backfill dirt in previously exposed rooms, constructing drainage systems, and doing stabilization on masonry walls. These activities could damage or displace original masonry, unearth cultural deposits, and alter the appearance of archeological elements. Development of additional visitor facilities and interpretive trails may adversely impact archeological deposits in the areas of development. Additional unsupervised visitation to these areas could result in collection of surface artifacts and illegal digging in the archeological sites. Increased exposure of visitors to more archeological resources could also result in increased appreciation for the resources and increased stewardship of the resources. These activities have a minor to moderate, long term adverse impact on archeological resources. Increased visitation and research may result in long-term beneficial impacts on the resources through knowledge gained and possible increased protection.

Over the long-term, research, park development, visitor uses, continued use and maintenance of the roads and well operations would result in a cumulative adverse impact on the archeological resources. However, over the long-term, research that recovers information that could otherwise be lost and increased visitor access could lead to better protection of resources through increased visitor understanding and appreciation and knowledge by management, resulting in cumulative beneficial impacts on archeological resources

On lands adjacent to the park, continued residential development and construction of pipelines, roads, and gas operations, in combination with natural events such as fire, flood, and drought, could result in the destruction of archeological resources that are components of or are integral to the understanding of resources within the park. Over the long-term, these effects would have cumulative, moderate, adverse impacts on archeological resources both in and adjacent to the park.

Conclusion
Under Alternative A, No Action, vehicle use, road maintenance, and leaks and spills could destroy or displace archeological resources. Plugging and reclamation according to Statewide standards could destroy or displace archeological resources. Existing operations would result in localized, short to long term depending on the activity, minor to moderate, adverse impacts on archeological resources on 2.74 acres.

Cumulative impacts from past, present, and future oil and gas development and associated surveys, along with other types of ground disturbing activities and visitor use development within and adjacent to the park, would result in a range of impacts from long-term, beneficial impacts gained from knowledge gained by archeological surveys required by the NPS for up to 6 new 9B plans of operations on up to 14 acres and increased visitor access leading to greater appreciation and protection; to short-to-long-term, minor to moderate, adverse impacts from future oil and gas operations, park development and operations, and visitor uses. No impairment would result from implementation of this alternative.

Impacts of Alternative B, Plan of Operations as Submitted Plus Additional Measures Identified Through Agency and Public Scoping, on Archeological Resources

Under Alternative B, XTO Energy would continue to operate the two existing natural gas wells under a plan of operations approved by the National Park Service in accordance with the 36 CFR Part 9B regulatory standards. In this case, the standard is avoidance of any further impacts to archeological resources.

The goal of avoidance of further impacts on archeological resources is expected to be accomplished by, but not limited to, the following:

- Road use restriction during conditions wet enough to cause rutting
- Speed limits reducing potential for accidental disturbance outside approved road width and further downcutting of the road.
- Requirement to maintain road width within a maximum allowable width
- Installation of geotextile materials and gravel padding where necessary to protect resources in the existing roadbed.
- Education of XTO Energy employees and contractors as to the significance of cultural resources in the park.
- Use of qualified archeologist during any ground disturbing maintenance activities.
- Implementation of a strong spill prevention, control, and countermeasure plan to minimize the risk that archeological resources would be accidentally impacted.
- Reclamation of the surface area after wells are plugged including measures to fully protect archeological resources in the area.

Because accidents and acts of noncompliance are possible and have the potential to cause adverse impacts, the NPS analysis cannot conclude with certainty that no further impacts to archeological resources would result from implementation of Alternative B. However, because of the mitigation measures that would be implemented to protect archeological resources from

both planned and unplanned events, Alternative B is expected to result in long-term, negligible adverse impacts on archeological resources.

Cumulative Impacts

Same as Alternative A, cumulative impacts would result in a range of impacts from long-term, beneficial impacts gained from knowledge gained by archeological surveys required by the NPS for up to 6 new 9B plans of operations on up to 14 acres and increased visitor access leading to greater appreciation and protection; to short-to-long-term, minor to moderate, adverse impacts from future oil and gas operations, park development and operations, and visitor uses. However, under Alternative B, further impacts to archeological resources from XTO Energy's two existing gas wells are likely to be avoided as described above. No impairment would result from implementation of this alternative.

Conclusion

Under Alternative B, operations would continue under an NPS-approved Plan of Operations with the goal of avoiding any further impacts to archeological resources. Because accidents and acts of noncompliance are possible, rather than concluding that no further impacts would occur, the NPS expects implementation of Alternative B to result in localized, long-term, negligible adverse impacts on archeological resources. Cumulative impacts from past, present, and future oil and gas development and associated surveys, along with other types of ground disturbing activities and visitor use development within and adjacent to the park, would result in a range of impacts from long-term, beneficial impacts to minor to moderate, adverse impacts on archeological resources in the park. No impairment would result from implementation of this alternative.

Impacts on Cultural Landscapes

To analyze the impacts on archeological resources, the park used research, existing literature, cultural resource surveys, other park plans, professional judgements and monument staff insights, public input, and consultation with other permitting agencies.

Affected Environment

Three cultural landscapes have been identified at Aztec Ruins NM, a prehistoric designed landscape, a historic designed landscape, and a historic vernacular landscape. An initial cultural landscape inventory indicates that the prehistoric designed landscape is eligible to be listed on the National Register, but the Park has not completed consultations with the New Mexico State Historic Preservation Officer (SHPO) regarding its eligibility. The SHPO has concurred that the historic designed landscape is eligible to be listed in the National Register. Both cultural landscapes would be treated as potentially eligible for listing on the National Register. According to an initial cultural landscape inventory, the historic vernacular landscape has lost integrity in a number of ways and is not eligible for National Register listing.

The prehistoric designed cultural landscape is about 320 acres in size and includes all lands within the currently authorized boundary of Aztec Ruins NM, including the West Ruin, Hubbard Tri-Wall site, Earl Morris Ruin, East Ruin, and the North Ruin and north mesa terrace sites.

Because natural landforms apparently played an important role in the layout and use of the prehistoric landscape, the true limits of the prehistoric landscape associated with the Park have not been and likely will not be determined. It is probable that the boundaries of the prehistoric

designed landscape may extend beyond the authorized boundaries of the Park. It is reasonable to consider the Estes Arroyo as a western boundary, the terrace above Farmer Arroyo to the north as a northeastern boundary, and the Animas River as a southeastern boundary of the larger prehistoric designed landscape. The Fee 4-A gas well and its access road, situated on the north terrace and within 100 yards of the North Ruin, clearly falls within the prehistoric designed cultural landscape within the Park.

The eligible historic designed landscape is within view of and northeast of the Fee 9Y well in the southwestern corner of the monument. The historic designed landscape is 7 acres in size. The boundary of the historic designed landscape, known as the visitor center complex, includes the lawns and grounds surrounding the historic Earl Morris house, which serves as the visitor center, the parking area for the visitor center, the monument entrance and parking lot, and the picnic area to the east of the visitor center. The historic designed landscape is outside of the project area for both natural gas wells, and would not be directly disturbed by their continuing operation.

The historic vernacular landscape includes the agricultural lands within the monument's authorized boundaries. Prior to the establishment of the park, the majority of the land in and around the prehistoric ruins was under cultivation. Over the years, the cultivated acreage was reduced due to development of the national monument and the growing town of Aztec. The boundaries of the historic vernacular landscape are the Farmer's Ditch on the north, the Animas River on the east, and the trailer park and residential development on the south. Landscape features associated with the historic vernacular landscape include irrigation features associated with Farmers Ditch, waters of the Animas River, irrigated hay fields and pasture, and the orchard located west of the Hubbard site. Lands within and in view of both the Fee 9Y and the Fee 4-A wells retain a rural character and hold remnants of agricultural elements and features. However, the historic vernacular landscape has lost integrity such as patterns of spatial organization, historic vegetation, associated buildings and structures, land use activities, and cluster arrangements.

Impact Thresholds

The thresholds of change for the intensity of an impact for cultural landscapes are defined as follows:

Negligible:	Impact(s) is at the lowest levels of detection - barely perceptible and not measurable.
Minor:	**Adverse impact** - impact would not affect the character defining features of a National Register of Historic Places eligible or listed cultural landscape. **Beneficial impact** – preservation of character defining features in accordance with the Secretary of the Interior's standards, to maintain existing integrity of the cultural landscape.
Moderate:	**Adverse impact** - impact would alter a character defining feature(s) of the cultural landscape but would not diminish the integrity of the landscape to the extent that its National Register eligibility is jeopardized. **Beneficial impact** – rehabilitation of a landscape or its features in accordance with the Secretary of the Interior's standards, to make possible a compatible use of the landscape while preserving its character defining features.
Major:	**Adverse impact** - impact would alter a character defining feature(s) of the cultural landscape, diminishing the integrity of the resource to the extent that it is no longer eligible to be listed in the National Register.

Beneficial impact – restoration in accordance with the Secretary of the Interior's standards, to accurately depict the features and character of a landscape as it appeared during its period of significance

Impacts of Alternative A, No Action on Cultural Landscapes.

Under Alternative A, No Action, the existing operations would continue to operate under "grandfathered" status. The NPS's regulatory authority for grandfathered operations under 36 CFR § 9.33(c) limits the NPS from imposing mitigation measures to prevent or minimize environmental impacts. However, under this provision, the Superintendent has the authority to suspend operations if grandfathered operations pose an immediate threat of significant injury to federally owned or controlled lands or waters so as to ensure that major adverse impacts are avoided, and to prevent an impairment of park resources and values.

Under No Action, continuing the two operations as is would mean that the wellpads and access roads would remain in place as they have for the last 20 years. The high visibility of the well pads, operational equipment, associated flowlines, and access roads will continue to be a moderate, adverse visual impact on the prehistoric designed and historic vernacular landscapes. The placement of the Fee 4-A well in particular may already have adversely affected landscape features and landforms that contributed to the particular sitings and relationships of the cultural sites on the north terrace. These effects, however, cannot be measured given that the grading of the wellpads and roads may have forever obscured or destroyed these original features.

Under no action, road maintenance as practiced in the past would continue. This could include periodic road grading, with the short term visibility of maintenance vehicles on the landscape. Occasional maintenance of the wells would continue, requiring the short term presence of workover rigs, compressors, and associated equipment.

In the event of a leak or spill, hydrocarbons, produced waters, or treatment chemicals could be released. Poorly maintained vehicles could drip or leak motor oil, coolant, and other lubricants on the access roads. Under No Action, the NPS would have the regulatory authority to suspend operations should there be an immediate threat of significant injury to park resources; therefore, major adverse impacts would be prevented. Cleanup of released hydrocarbons, produced waters, or treatment chemicals may be accomplished by XTO Energy under Statewide standards. However, contaminants could create a short term visible impact on the landscape. Clean up efforts through the removal of soil could damage landscape features that are integral to the prehistoric designed landscape.

Reclamation under this alternative would meet statewide standards. Reclamation activities, especially at the Fee 4-A, could have the potential to create topographical changes that do not reflect the original topography upon which the prehistoric designed landscape was founded. Relationships of cultural features to each other and to land features could be destroyed. These activities could also destroy cultural features themselves that are integral to or contribute to the prehistoric designed landscape. While NPS regulatory authority under 36 CFR § 9.39(c) would ensure that major impacts are avoided, reclamation could result in less than full protection for the cultural landscapes in the area. If reclamation is not conducted in a sensitive manner, loss of features associated with the cultural landscapes could occur over the long term.

Cumulative Impacts

Under Alternative A, No Action, cumulative impacts on cultural landscapes throughout the park could result from existing and abandoned oil and gas operations on about 4 acres**.** Possible

additional wellpads and associated access roads and flowlines would cause direct loss of cultural landscapes.

The construction and maintenance of gas access roads, wellpads, compressors, flowlines, gathering lines, and pipelines would result in directly destroying and altering landforms and topography associated with the placement of cultural features, and/or disturbing or destroying cultural features. The result could be long-term minor to moderate adverse impacts on up to 14 acres in the Park**.**

Additional foreseeable activities within the park that could affect the cultural landscapes include interpretive trail development, visitor and staff facility development, preservation activities of prehistoric remains, and revegetation efforts. Activities outside of the park, including residential development, road building, and energy extraction, could adversely affect the cultural landscapes by destroying cultural features and physical landforms that are integral to those landscapes as a whole.

Under Alternative A, No Action, with past, present, and future oil and gas operations in and adjacent to the park; park activities, park development; and activities exterior to the park boundaries, would result in localized, long term, minor to moderate, adverse impacts on cultural landscapes.

Conclusion

Under Alternative A, No Action, existing operations would continue under "grandfathered" status, resulting in localized, short to long term, minor to moderate, adverse impacts on cultural landscapes on 2.74 acres. The presence of the well operations and access roads add foreign visual elements to the prehistoric designed and historic vernacular landscapes. If access roads are not sensitively maintained, physical landforms and cultural features integral to the landscapes may be destroyed. Plugging and reclamation according to statewide standards and associated re-contouring of the surface may destroy physical landforms or cultural features integral to the landscapes. Cumulative impacts from past, present, and future oil and gas operations in and adjacent to the park; park operations and development; development exterior to the park's boundaries are expected to result in localized, long term, minor to moderate, adverse impacts on cultural landscapes. No impairment to cultural landscapes would result from implementation of this alternative

Impacts of Alternative B, Plan of Operations as Submitted Plus Measures Identified Through Agency and Public Scoping, on Cultural Landscapes

Under Alternative B, the impacts on cultural landscapes are expected to be similar to, but slightly less than, those under Alternative A. This is because most of the impacts have already occurred, and the activities necessary to conduct operations would continue. The impacts on cultural landscapes are expected to be slightly less than the no action alternative because of:

- Implementation of a strong spill prevention, control, and countermeasure plan to minimize the risk that cultural landscapes would be accidentally impacted.
- Reclamation of the surface area after wells are plugged including measures to fully consider cultural landscapes in the area.
- Education of XTO Energy employees and contractors as to the significance of cultural landscapes in the park would serve to reduce acts of noncompliance that might affect cultural landscapes.

- The provision that XTO Energy will submit final well plugging and reclamation plans for approval by the park prior to their implementation will assure that actions included in those plans will have the lowest adverse effect on cultural landscapes possible.

The high visibility of the wellpads, operational equipment, associated flowlines, and access roads will continue to be a localized, short term to long term, minor to moderate, adverse impact on the prehistoric designed and historic vernacular landscapes. Plugging and reclamation provisions will contribute toward reducing long term adverse impacts on cultural landscapes.

Cumulative Impacts

Cumulative impacts on cultural landscapes under Alternative B are similar to, but slightly less than, those under Alternative A for the reasons cited above. Under Alternative B, cumulative impacts from past, present, and future oil and gas operations in and adjacent to the park; park activities, park development; and activities exterior to the park boundaries, are characterized as localized, long term, minor to moderate, adverse impacts on cultural landscapes.

Conclusion

Under Alternative B, the impacts on cultural landscapes are expected to be similar to, but slightly less than, those under Alternative A. The high visibility of the well pads, operational equipment, associated flowlines, and access roads would continue to be a localized, short term to long term, minor to moderate adverse impact in a visual sense on the prehistoric designed and historic vernacular landscapes. Cumulative impacts from past, present, and future oil and gas operations in and adjacent to the park; park activities, park development; and activities exterior to the park boundaries, are characterized as localized, long term, minor to moderate, adverse impacts on cultural landscapes. No impairment to the cultural landscapes would result.

Impacts on Visitor Use and Enjoyment

Affected Environment

Visitor use is currently focused on the self-guided interpretive trail through the West Ruin, located just north of the visitor center. A portion of the trail travels to an outlying site, the Hubbard Site, just north of the West Ruin. From this vantage visitors have a view of the former agricultural fields to the north, and the north mesa. The storage tank of the Fee 4-A gas well is situated on the north mesa, and is visible from this point, as well as from other elevated points on the interpretive trail through the West Ruin. It is approximately 1500 feet from the West Ruin.

The Fee 9Y well is visible to visitors as they approach the visitor center from the south by automobile, just prior to entering the park. It is visible from the RV parking lot that is west of the visitor center parking lot, although some vegetation obscures some of the operation. The Fee 9Y well site is approximately 250 feet from the parking lot, and 600 feet from the West Ruin.

Other areas of the park are closed to visitor access unless accompanied by park staff. Occasionally the park conducts guided tours to the North Mesa. Visitors travel by personal vehicle, and use the same access road that the operator of the Fee 4-A well uses to service the well. Visitors then are escorted to the North Ruin site after parking along the access road. From the north mesa visitors experience a sweeping view of the Animas River Valley, and an impressive view north toward the San Juan Mountains. They are able to appreciate a more comprehensive perspective of the ancestral Pueblo people, and explore the park themes related

to the expanded community, cultural landscapes, human interaction with the environment, and changing perspectives and interpretations of the people.

Impact Thresholds

The thresholds of change for the intensity of an impact for visitor use and enjoyment are defined as follows:

- *Negligible* – impact to the activity is barely perceptible and not measurable and confined to a small area.
- *Minor* – impact to the activity is perceptible and measurable and is localized.
- *Moderate* – impact is clearly detectable and could have appreciable effect on the activity.
- *Major* – impact would have a substantial, highly noticeable influence on the activity on a regional scale.

Impacts of Alternative A, No Action On Visitor Use and Enjoyment.

Under Alternative A, No Action, the existing operations would continue to operate under "grandfathered" status. The wellpads and access roads would remain in place as they have for the last 20 years.

From the vantage point of the West Ruin where most visitor experience occurs, the storage tank of the Fee 4-A well would remain visible on the horizon as they look north, creating a negligible to minor adverse visual impact on their experience, depending on the visitor. When well maintenance occurs with workover rigs in place, the rigs are highly visible and at times the associated operations can be heard by those experiencing the interpretive trail in the West Ruin, creating a strong contrast between the West Ruin dating from the AD 1100's and the modern technology that supports today's well operations. The contrast may be disturbing to those attempting to place themselves in a different time period and setting; or it could be experienced by some as a way to understand and appreciate the contrasts and similarities between today's cultures and those responsible for the ancestral remains within the Park.

For visitors who experience the north terrace through the occasional guided tour, the Fee 4-A well pad and associated access road and operation, would continue to be highly visible and present in their experience of the resources on the north terrace. Occasional venting of gas by the well, which is a very distinct sound, will distract visitors, impacting their auditory experience of the area. During well maintenance with the presence of workover rigs and associated equipment, the well operation would be not only highly visible but very audible, having a moderate adverse impact on the visitor experience.

Thus, depending on the visitor uses and perceptions of oil and gas operations, there could be localized, short-term to long-term, negligible to moderate, adverse impacts on the visitor use and experiences under Alternative A.

Cumulative Impacts

Under Alternative A, No Action, cumulative impacts on visitor use and experience landscapes throughout the park could result from existing and abandoned oil and gas operations on 4 acres.

The construction and maintenance of new gas access roads, wellpads, compressors, flowlines, gathering lines, and pipelines could result in directly destroying cultural resources integral to the

experience of the visitor, and creating visual disturbances that could interfere with visitor experience, and could result in long term adverse impacts on up to 14 acres in the Park.

Additional foreseeable activities within the park that could affect visitor use and enjoyment include interpretive trail development, visitor facility development, and preservation of cultural resources. Some of these activities could have either long-term or short-term adverse or beneficial impacts on visitor use and experience. An interpretive trail for visitors to the north mesa would likely pass very close to the Fee 4-A well. This would bring many more visitors to that area, resulting in many visitors seeing and hearing the well. Activities outside of the park, including residential development, road building, and energy extraction, could adversely affect visitor use and experience by adversely impacting the viewshed, destroying cultural features and landscapes related to cultural resources within the park, and creating additional noise.

Thus, depending on the visitor uses and perceptions of oil and gas operations, there could be localized, minor to moderate, short-term or long-term, adverse or beneficial cumulative impacts on visitor use and experience under Alternative A.

Conclusion

Under Alternative A, No Action, existing operations would continue to cause localized, negligible to moderate, short-term and long term, adverse impacts on visitor use and experience. Cumulative impacts from past, present, and future oil and gas operations in and adjacent to the park, park development, and activities exterior to the park boundaries, would result in localized, minor to moderate, short-term or long-term, adverse or beneficial impacts on visitor use and experience.

Impacts of Alternative B, Plan of Operations as Submitted Plus Additional Measures Identified Through Agency and Public Scoping, on Visitor Use and Experience

Same as Alternative A, there would be localized, negligible to moderate, short-term to long-term, adverse impacts on the visitor experience. Under Alternative B, XTO Energy is required to notify and receive concurrence from the Superintendent for various activities, which provides the opportunity to schedule activities during low visitor use periods. The visual and auditory impacts would be the same, but slightly fewer visitors would experience them.

Cumulative Impacts

Cumulative impacts on visitor use and experience under Alternative B are similar to, but slightly less than, those under Alternative A for the reason cited above. Under Alternative B, cumulative impacts from past, present, and future oil and gas operations in and adjacent to the park; park activities, park development; and activities exterior to the park boundaries, would result in localized, minor to moderate, short-term to long-term, adverse or beneficial impacts on visitor use and experience.

Conclusion

Under Alternative B, impacts on visitor use would be slightly less than under Alternative A, but continue to cause localized, negligible to moderate, short-term to long term, adverse impacts. Cumulative impacts from past, present, and future oil and gas operations in and adjacent to the park; park development; and activities exterior to the park boundaries, would result in localized, minor to moderate, short-term to long-term, adverse or beneficial impacts on visitor use and experience. No impairment to visitor use and enjoyment would result.

CONSULTATION AND COORDINATION

The Plan of Operations and this Environmental Assessment will be on public review for 30 days from the publication date of a notice of availability in the *Federal Register.*

Following the 30-day public review period, NPS will consider written comments received. Additional mitigation measures resulting from the public involvement process may be applied by the NPS as conditions of approval of the Plan of Operations. Additional mitigation measures will be identified in the decision document.

Individuals and Agencies Consulted

Persons and agencies contacted for information, or that assisted in identifying important issues, developing alternatives, or analyzing impacts are listed below:

Mr. Ernie Valdez, Wildlife Biologist, USGS, Albuquerque, NM
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http://ifw2es.fws.gov/endangeredspecies/lists/ListSpecies.cfm**.** Visited May, 2004 for a list of federal endangered, threatened, and candidate species.

http://redtail.unm.edu/bisonm/bisonquery.php. Visited May, 2004 for additional information for both state and federally listed species.